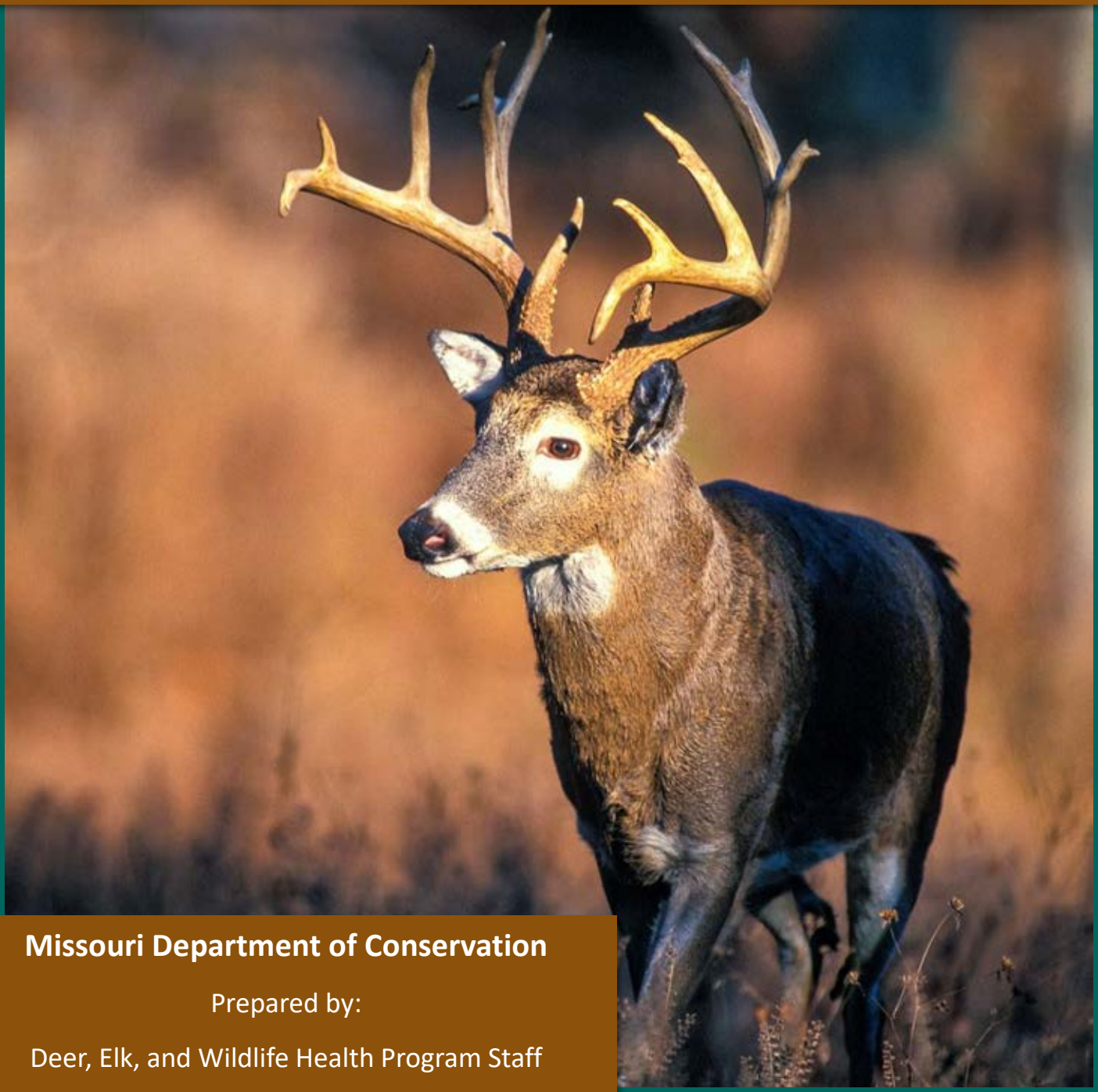
2019

Missouri Deer Season Summary & Population Status Report



Missouri Department of Conservation

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Science Branch

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Deer Program Mission and Vision

The mission of the Missouri Department of Conservation's Deer Program is to use science-based wildlife management to maintain biologically and socially balanced deer populations that provide sustainable recreation and that minimize conflicts with humans and the potential for negative impacts on ecosystem health. To put this mission into action, the Deer Program is guided by four management goals:

Goal 1: Deer Population Management – Proactively manage deer populations for a balanced sex and age structure while maintaining densities at or below the biological and social carrying capacity within the defined management units using science-based wildlife management practices.

Goal 2: Hunting and Recreation – Provide opportunities for all citizens to enjoy deer and related recreational activities and promote hunting as a socially and culturally important tradition which is the primary tool for achieving deer population goals.

Goal 3: Health and Disease Management – Ensure the maintenance of healthy deer populations and minimize the threat and impacts of disease on deer populations in Missouri.

Goal 4: Education, Communication, and Public Engagement – Provide adequate information to the public about all aspects of deer management in Missouri and create opportunities for additional public engagement in decisions about the management of Missouri's deer resources.

The Deer Program, managed by the Science Branch, develops annual regulation recommendations based on harvest data, hunter and landowner surveys, MDC staff surveys, public comments, population simulations, and the Chronic Wasting Disease (CWD) Surveillance and Management Plan. The protection and management of all of Missouri's valuable wildlife is made possible thanks to private landowners and all other Missourians supporting the one-eighth of one percent Conservation Sales Tax, permit sales, and income generated by fish and wildlife tourism.

Thank you!




Equal Opportunity to Participate

Equal opportunity to participate in, and benefit from, programs of the Missouri Department of Conservation is available to all individuals without regard to their race, color, nationality, sex, age, or disability. Questions should be directed to the Department of Conservation, PO Box 180, Jefferson City, MO 65102, 573-751-4115 (voice) or 800-735-2966 (TTY), or to the U.S. Fish and Wildlife Service Division of Federal Assistance, 4401 N. Fairfax Drive, Mail Stop: MBSP-4020, Arlington, VA 22203.

2019 Deer Season Overview

Season	Dates	What Was New for 2019?	
Archery Deer and Turkey	Sept. 15 - Nov. 15, 2019 Nov. 27, 2019 - Jan. 15, 2020	• During Nov. 16-17, hunters who harvested a deer in the CWD Management Zone must have taken their deer on the day of harvest to a designated CWD sampling station. • New counties were added to the CWD Management Zone. Other counties were removed. • An antler point restriction was reinstated in Benton, Boone, Callaway, Carroll, Cole, Cooper, Grundy, Livingston, Miller, Moniteau, Morgan, Osage, Randolph, Schuyler, Scotland, and Shelby counties. • Adults no longer needed a permit to assist properly licensed youth hunters during the youth portions of the firearms deer season. • Lessees were no longer eligible for no-cost resident landowner permits. • Hunters could fill two firearms antlerless permits in Audrain, Christian, Clark, Dallas, Lewis, Marion, Monroe, Pike, and Ralls counties.	• Qualifying landowners in Andrew, Atchison, Holt, and Nodaway counties could receive only one no-cost firearms antlerless permit. • Qualifying landowners in Christian, Lawrence, Pulaski, Ripley, Shannon, and Webster counties could receive two no-cost firearms antlerless permits. • Barton, Christian, Dent, Douglas, Jasper, Lawrence, Maries, Newton, Oregon, Phelps, Pulaski, Ripley, Shannon, Texas, Webster, and Wright counties were added to the list of counties open during the antlerless portion of firearms deer season. • New managed deer hunts were added. Others were removed. • Deer hunting regulations changed for some conservation areas. • Nontoxic shot was required on several conservation areas that did not require it in the past.
Firearms Deer Early Youth Portion	Nov. 2-3, 2019		
Firearms Deer November Portion	Nov. 16-26, 2019		
Firearms Deer Late Youth Portion	Nov. 29 - Dec. 1, 2019		
Firearms Deer Antlerless Portion	Dec. 6-8, 2019		
Firearms Deer Alternative Methods Portion	Dec. 28, 2019 - Jan. 7, 2020		

Total deer harvest during the 2019 deer season (285,873) was slightly (1%) lower than the 2018 harvest total (**Table 1**). Overall firearms deer harvest (222,820) was 5% lower than during 2018. The archery deer harvest (61,407) was 16% higher than 2018 and was a new harvest record. Harvest during the November portion of firearms deer season (179,960) was 10% lower than in 2018. The early youth portion harvest total (18,289) was up 34% from 2018, whereas the late youth portion total (1,950) was down 25% from last year. Harvest during the alternative methods portion (12,024) was similar (less than 1% difference) to the previous year, and harvest during the antlerless portion (10,597) was up nearly 60% from 2018 (**Table 2**). Compared to the 2018 deer season, antlered buck harvest was down 2%, doe harvest was up slightly (less than 1% difference), and harvest of button bucks was down 7% in 2019 (**Figure 1**).

Many of the changes in the 2019 deer harvest compared to the previous year can be attributed to the calendar shift which resulted in the November portion starting about a week later (Nov. 16) in 2019 than it did in 2018. This shift in season timing resulted in the November portion occurring after the peak of the rut when bucks are less vulnerable to harvest. In contrast, during 2018, the November portion opened on Nov. 10, which coincided more closely with the peak of breeding. Whenever the calendar shifts, causing the November portion to occur later, a predictable reduction in harvest occurs. Because about 70% of the total deer harvest occurs during the November portion, changes to harvest during this portion have a significant effect on overall harvest.

Just as the calendar shift affected harvest during the November portion, so too, did it during the archery season. The later start date of the November portion provided archers with an additional six days of bowhunting during the peak of the rut. About 20% of the total archery season harvest typically occurs during the week before the November portion begins. So, it isn't surprising that we saw a large increase in the 2019 archery harvest total. In addition to additional days of archery hunting during peak rut, 129,775 Archery Any-Deer Hunting Permits were sold during 2019, which was up about 5% from 2018 and was a new archery permit sales record.

Table 1. Total 2019 harvest by region compared to 2018, the 5-year average, and the 10-year average.

Region	Total Harvest	Difference from 2018	Difference from 5-Yr Avg.	Difference from 10-Yr. Avg.
Central	46,964	0%	7%	8%
Kansas City	27,774	-3%	3%	0%
Northeast	38,729	-11%	-2%	-7%
Northwest	29,004	-4%	26%	-2%
Ozark	40,668	2%	-2%	5%
Southeast	31,545	-6%	0%	5%
Southwest	41,711	2%	2%	6%
St. Louis	29,478	9%	37%	30%
Statewide	**285,873**	**-1%**	**9%**	**6%**

Deer Season Summary

Deer populations across most of Missouri are currently at desired levels (**Figure 15**). Therefore, statewide deer management goals are largely focused on stabilizing deer numbers. As deer populations continue to grow, the MDC Deer Program will look for opportunities to liberalize harvest to address any negative social issues that arise. Statewide deer management also continues to be focused on minimizing the impacts of CWD. Surveillance for CWD is ongoing across the state to detect new areas of infection. Where CWD is known to occur, harvest is liberalized to keep the population from increasing and to remove additional infected animals. These measures help limit additional disease spread to healthy animals or new locations.

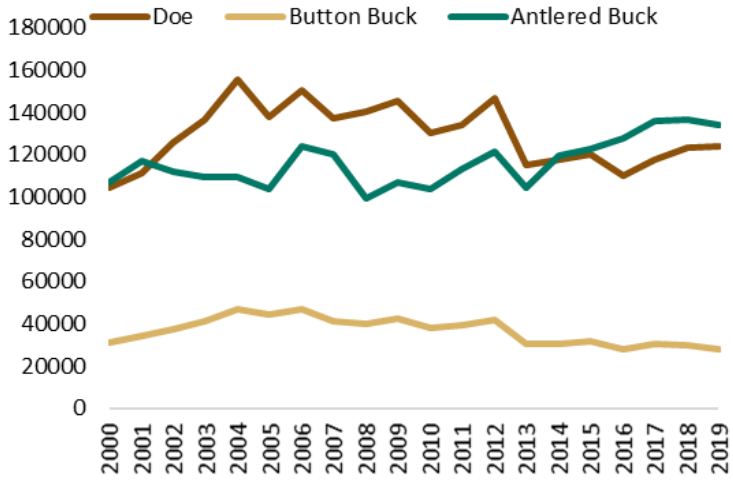


Figure 1. Number of does, antlered bucks, and button bucks harvested statewide from 2000-2019.

Archery and Firearms Season: By the Numbers

Figure 2. Success rates of firearms and archery deer hunters from 2010-2019. Firearms hunter success rates decreased in 2019. Archery hunter success rates increased in 2019 and were the highest in recent history.

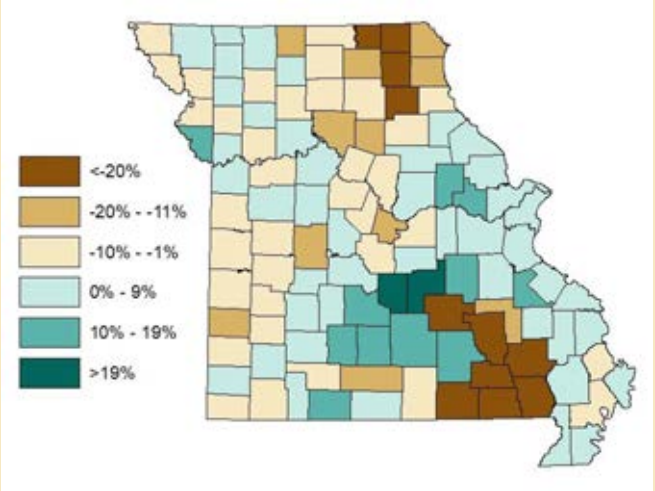


Figure 3. Percent change in total deer harvest by county in 2019 compared to the 2018 deer season.

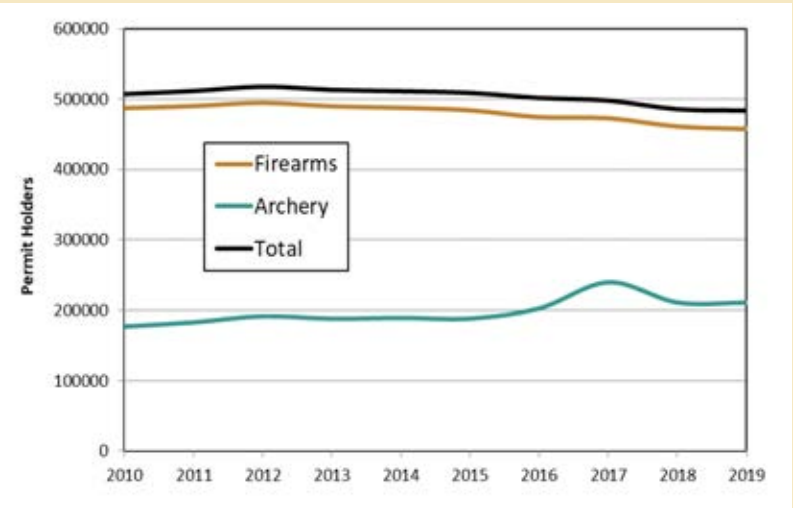


Figure 4. Trend in any-deer permit holders, 2010-2019.

Last year, there were about 450,000 unique firearms deer permit holders in Missouri and about 210,000 archery deer permit holders. Although deer hunting remains a very popular activity for Missouri residents and our guests, we have seen declines in the number of firearms permits since 2012. This trend is not unique to Missouri, with many other states also experiencing declining hunter numbers. Hunter recruitment and retention remains an important priority for MDC. The number of archery permit holders continues to increase, particularly in recent years, partly due to allowing crossbows as a legal method for all archers. The large increase in archery permit holders in 2017 was the result of a change to the permitting system with some landowners receiving archery deer permits that had no intention of using them. Thus, the 2018 number more accurately reflects trends in archery hunter participation.

Table 2. Deer Season Harvest Comparison: 2018-2019

Season Portion	Antlered Buck			Button Buck			Doe			Total		
	2018	2019	Change	2018	2019	Change	2018	2019	Change	2018	2019	Change
Archery	20,708	26,331	27%	5,351	5,548	4%	26,864	29,528	10%	52,923	61,407	16%
Managed Hunts	439	506	15%	235	185	-21%	895	955	7%	1,569	1,646	5%
Early Youth	7,834	11,663	49%	1,447	1,541	6%	4,364	5,085	17%	13,645	18,289	34%
Late Youth	1,160	771	-34%	338	204	-40%	1,097	975	-11%	2,595	1,950	-25%
November	103,582	91,917	-11%	20,041	17,330	-14%	77,115	70,713	-8%	200,738	179,960	-10%
Alternative Methods	3,096	2,858	-8%	1,588	1,585	0%	7,425	7,581	2%	12,109	12,024	-1%
Antlerless	32	46	44%	1,114	1,577	42%	5,499	8,974	63%	6,645	10,597	59%
Total	**136,851**	**134,092**	**-2%**	**30,114**	**27,970**	**-7%**	**123,259**	**123,811**	**0%**	**290,224**	**285,873**	**-1%**

Table 3. Permits Issued and Harvest by Permit Type

Permit Type[1]	Number of Permits			Number of Deer Harvested		
	2018	2019	Change	2018	2019	Change
Permittee Archery Any-Deer	117,142	121,651	4%	24,483	24,724	1%
Landowner Archery Any-Deer	98,653	91,301	-8%	6,117	6,926	13%
Youth Archery Any-Deer	7,645	8,124	6%	1,180	1,337	13%
Permittee Archery Antlerless	59,214	64,259	9%	14,767	15,673	6%
Landowner Archery Antlerless	187,967	173,095	-8%	6,506	6,772	4%
Youth Archery Antlerless	3,168	3,629	15%	504	563	12%
Permittee Firearms Any-Deer	278,289	279,249	<1%	87,470	70,836	-19%
Landowner Firearms Any-Deer	172,775	160,739	-7%	39,547	34,780	-12%
Youth Firearms Any-Deer	50,512	51,886	3%	18,264	19,184	5%
Permittee Firearms Antlerless	187,688	192,034	2%	59,314	55,056	-7%
Landowner Firearms Antlerless	158,272	152,091	-4%	22,945	20,948	-9%
Youth Firearms Antlerless	24,036	25,879	8%	7,056	7,085	<1%
Resident Firearms	837,402	826,638	-1%	219,429	207,984	-5%
Nonresident Firearms	34,170	35,240	3%	15,167	14,127	-7%
Resident Archery	458,439	445,021	-3%	48,632	55,995	15%
Nonresident Archery	15,350	17,038	11%	4,925	5,947	21%

[1] This table is not an inclusive list of permit types.

Table 4. Deer Hunter and Harvest Numbers

	Archery	Firearms	Archery & Firearms Combined
Age Distribution of Hunters	**Number of Hunters**		**Total Hunters[1]**
10 or younger	3,521	21,922	22,313
11-15	11,092	42,766	43,629
16-40	86,477	168,605	182,582
41 or older	110,394	224,013	234,998
Total hunters	211,484	457,306	483,522
Any-Deer Permits Issued	**Number of Permits**		**Number of Hunters[1]**
Resident	117,209	309,725	328,086
Nonresident	13,425	23,325	33,048
Landowner	91,855	161,703	164,131
Antlerless Permit Sales[2]	**Number of Hunters**		**Total Hunters**
1	41,281	157,207	143,838
2	7,920	25,727	42,395
3	1,787	2,342	9,775
4 or more	1,213	814	6,276
Deer Harvested	**Number of Hunters**		**Number of Hunters[3]**
0	164,572	277,069	278,196
1	36,390	144,133	149,180
2	7,758	30,542	40,977
3	1,848	4,803	10,383
4 or more	916	759	4,786
Antlered Bucks Harvested[4]	**Number of Hunters**		**Number of Hunters[3]**
0	185,493	350,843	358,414
1	25,445	105,771	116,769
2	546	692	8,339
Deer Harvested	**Percent of Hunters**		**Percent of Hunters[3]**
0	77.82%	60.59%	57.53%
1	17.21%	31.52%	30.85%
2	3.67%	6.68%	8.47%
3 or more	1.31%	1.22%	3.14%
Antlered Bucks Harvested[4]	**Percent of Hunters**		**Percent of Hunters[3]**
0	87.71%	76.72%	74.13%
1	12.03%	23.13%	24.15%
2	0.26%	0.15%	1.72%

[1] Number of individuals that held an archery and/or firearms any-deer permit.

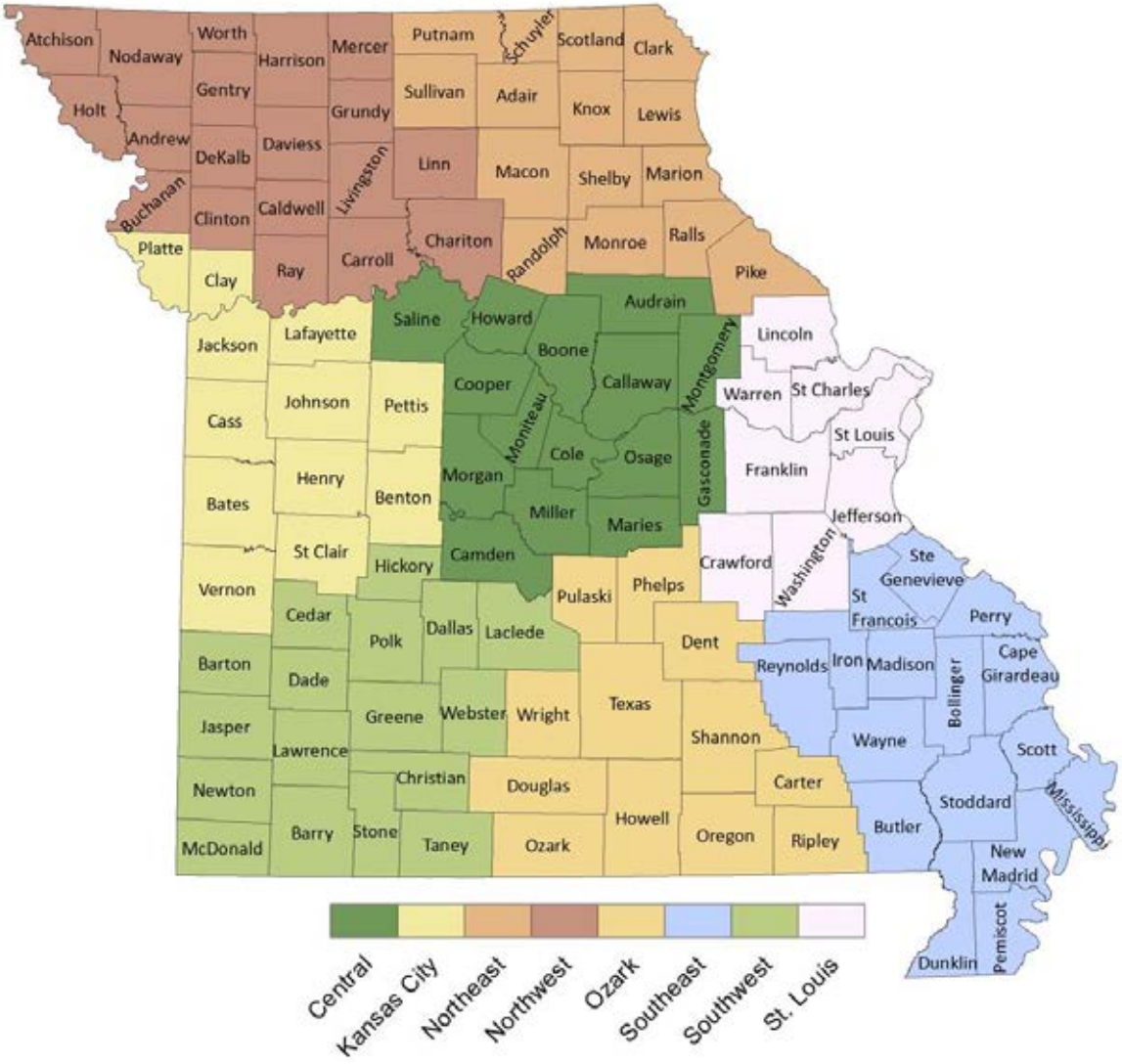
[2] Excludes no-cost landowner permits.

[3] Number/percent of hunters that harvested the specified number when combining their archery and firearms harvest.

[4] Includes hunters that harvested antlered bucks during managed hunts.

Deer Population Status

Statewide deer population trends are important; however, regional trends are more informative to most landowners and hunters. It is also important to acknowledge that deer populations can vary considerably within a region and even within a county. Regional and local diversity in deer numbers can be a result of differences in land cover and use, harvest regulations, hunter goals and density, and disease events. Therefore, regional information should be considered as a starting point when evaluating deer populations within a localized area.



Regional Offices

Central Region
3500 East Gans Road
Columbia, MO 65201
573-815-7900

Kansas City Region
12405 SE Ranson Road
Lee's Summit, MO 64082
816-622-0900

Northwest Region
701 James McCarthy Drive
St. Joseph, MO 64507
816-271-3100

Ozark Region
551 Joe Jones Blvd.
West Plains, MO 65775
417-256-7161

Southeast Region
2302 County Park Drive
Cape Girardeau, MO 63701
573-290-5730

Northeast Region
3500 S. Baltimore
Kirksville, MO 63501
660-785-2420

Southwest Region
2630 N. Mayfair
Springfield, MO 65803
417-895-6880

St. Louis Region
2360 Highway D
St. Charles, MO 63304
636-441-4554

Central Region Deer Summary

In 2019, the Central Region had the highest regional deer harvest with a total of 46,964 deer (**Table 1, Figure 5**) which was less than 1% higher than in 2018. In 2019, the Central Region ranked 2nd among regions for the number of deer harvested per square mile. Top harvest counties within the region were Callaway, Osage, and Morgan. The deer population in the Central Region continues to recover from a low point in 2013 following a particularly extreme outbreak of hemorrhagic disease. Survey data indicate that regional deer numbers are at socially acceptable numbers (**Figure 15**).

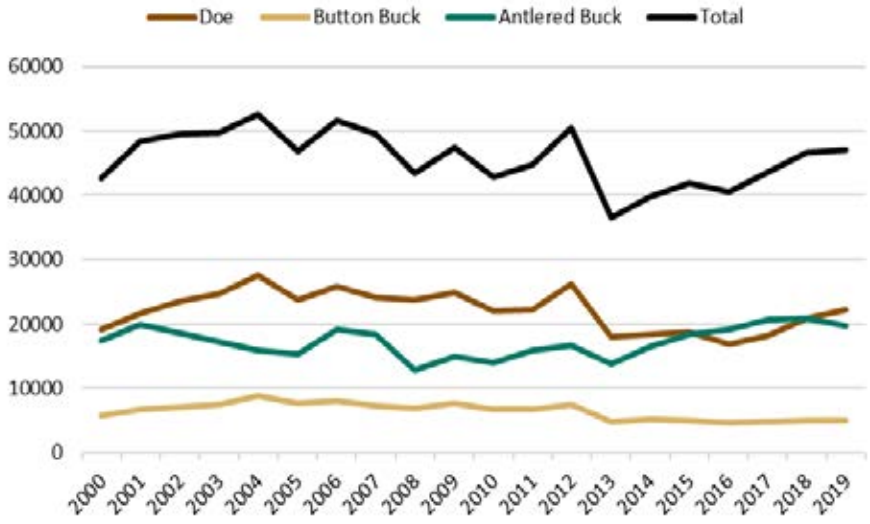


Figure 5. Central Region harvest trend from 2000-2019.

County	Total Harvest	Deer Harvested Per Square Mile	Trips per Kill (Firearms)	Public Land Hunting Acres	Number Public Hunting Areas
Audrain	2,226	3.4	5.5	1,975	5
Boone	3,411	5.6	5.7	14,142	11
Callaway	5,708	7.3	7.1	26,438	7
Camden	3,529	5.8	10.3	3,127	6
Cole	1,613	4.6	9.2	4,443	7
Cooper	2,393	4.5	6.1	5,505	2
Gasconade	4,052	8.2	5.2	1,437	1
Howard	2,402	5.5	8.2	8,062	6
Maries	2,408	4.7	7.3	2,315	3
Miller	2,882	5.1	10.6	5,310	3
Moniteau	1,819	4.6	5.7	4,427	5
Montgomery	3,692	7.3	6.1	4,162	8
Morgan	4,185	7.3	7.0	3,955	7
Osage	4,641	8.0	6.9	3,238	5
Saline	2,003	2.9	9.4	8,700	4
Total (t)/Avg (a)	**t = 46,964**	**a = 5.7**	**a = 7.4**	**t = 97,236**	**t = 80**

Kansas City Region Deer Summary

Total harvest for the Kansas City Region was 3% lower in 2019 than in 2018 at 27,774 deer harvested (**Table 1, Figure 6**). The deer harvest in Kansas City Region ranked 8th among the other regions and 6th for the number of deer harvested per square mile. Top harvest counties within the region were Benton, St. Clair, and Henry. The deer population continues to increase following the decline that occurred because of the 2012 hemorrhagic disease outbreak. Survey data indicate that deer numbers are at socially acceptable numbers in most counties (**Figure 15**).

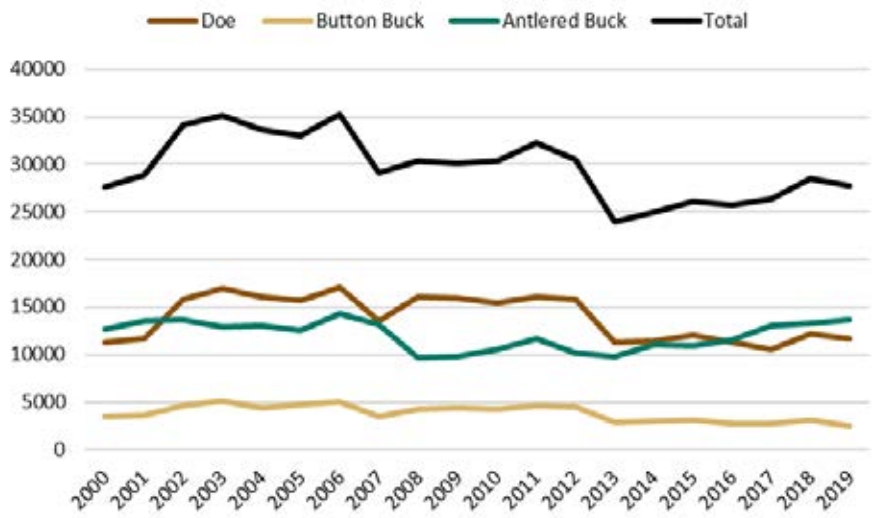


Figure 6. Kansas City Region harvest trend from 2000-2019.

County	Total Harvest	Deer Harvested Per Square Mile	Trips per Kill (Firearms)	Public Land Hunting Acres	Number Public Hunting Areas
Bates	1,905	2.5	8.0	5,728	6
Benton	4,084	6.1	6.9	13,845	11
Cass	2,193	3.5	10.7	5,137	4
Clay	984	3.3	13.2	1,411	2
Henry	3,010	5.0	7.9	31,928	7
Jackson	1,871	4.9	7.9	4,851	6
Johnson	2,671	3.5	6.4	4,579	3
Lafayette	1,304	2.2	13.2	2,272	5
Pettis	2,507	3.9	5.6	3,149	12
Platte	1,081	3.1	8.5	4,225	6
Saint Clair	3,412	5.4	4.2	28,057	9
Vernon	2,752	3.8	5.4	27,092	13
Total (t)/Avg (a)	**t = 27,774**	**a = 3.9**	**a = 8.2**	**t = 132,274**	**t = 84**

Northeast Region Deer Summary

Total harvest for the Northeast Region in 2019 was 38,729, which was 11% lower than in 2018 (**Table 1, Figure 7**). The deer harvest ranked 4th among the other regions, and the Northeast Region ranked 3rd in the number of deer harvested per square mile. Top harvest counties in 2019 were Pike, Macon, and Monroe. Following a considerable decline in deer numbers caused by the hemorrhagic disease outbreak in 2012, deer numbers in the Northeast Region have been slowly rebounding. Survey data indicate that regional deer numbers are at socially acceptable numbers in most counties (**Figure 15**).

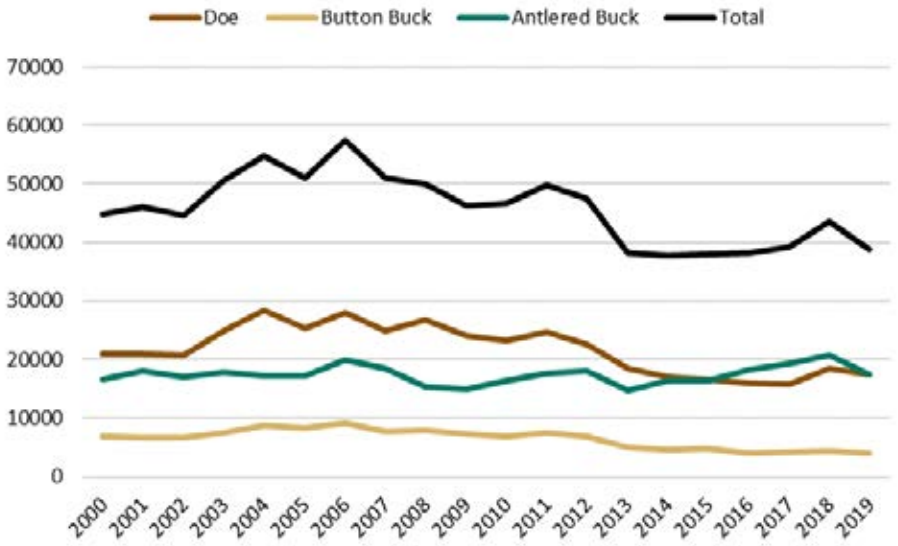


Figure 7. Northeast Region harvest trend from 2000-2019.

County	Total Harvest	Deer Harvested Per Square Mile	Trips per Kill (Firearms)	Public Land Hunting Acres	Number Public Hunting Areas
Adair	2,574	4.9	5.8	6,634	5
Clark	2,106	4.4	8.0	6,627	7
Knox	2,021	4.3	9.4	1,244	2
Lewis	1,899	4.0	11.3	8,313	6
Macon	3,957	5.3	7.1	15,551	11
Marion	2,145	5.3	4.9	3,850	11
Monroe	3,432	5.7	7.5	2,976	5
Pike	4,523	7.3	8.4	13,856	6
Putnam	2,508	5.2	7.8	5,290	4
Ralls	2,497	5.6	9.0	1,200	2
Randolph	2,408	5.4	8.9	6,493	3
Schuyler	1,452	5.0	8.0	1,159	1
Scotland	2,354	5.7	6.7	4,045	2
Shelby	2,356	5.0	8.6	2,202	6
Sullivan	2,497	4.1	7.4	9,691	5
Total (t)/Avg (a)	**t = 38,729**	**a = 5.1**	**a = 7.9**	**t = 89,131**	**t = 76**

Northwest Region Deer Summary

In 2019, total harvest for the Northwest Region was 29,004, which was 4% lower than the 2018 harvest total **(Table 1, Figure 8)**. The Northwest Region ranked 7th in total deer harvest and 8th in deer harvested per square mile. Top harvest counties were Harrison, Linn, and Daviess. Over the past 15 years, deer population estimates and harvest in the Northwest Region have declined more sharply than any other region. These declines are attributed to a severe hemorrhagic outbreak in 2012, as well as historically liberal antlerless harvest and habitat loss through conversion of CRP to row-crop agriculture. The deer population in most Northwest Region counties is at socially acceptable levels. (**Figure 15**).

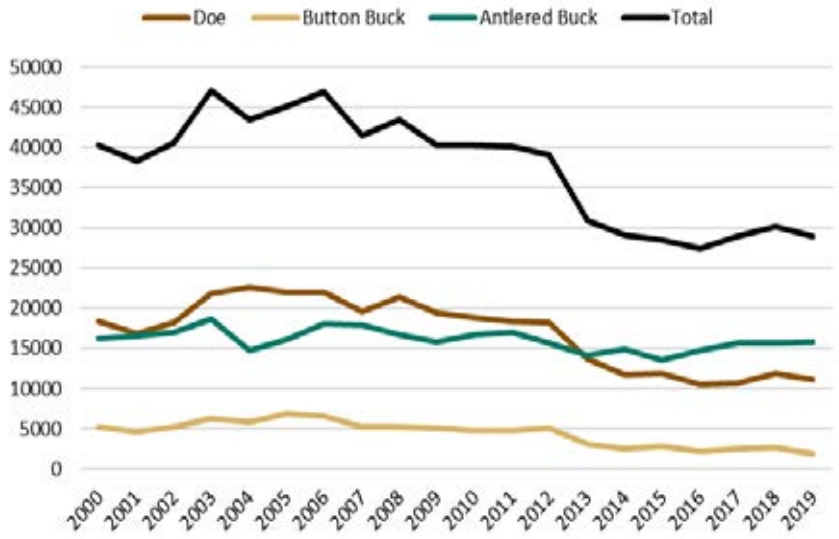


Figure 8. Northwest Region harvest trend from 2000-2019.

County	Total Harvest	Deer Harvested Per Square Mile	Trips per Kill (Firearms)	Public Land Hunting Acres	Number Public Hunting Areas
Andrew	1,006	2.5	24.3	6,236	9
Atchison	597	1.1	17.4	9,989	8
Buchanan	715	2.0	9.8	3,830	10
Caldwell	1,442	3.6	7.7	1,941	1
Carroll	2,199	3.4	10.8	3,985	4
Chariton	1,814	2.8	8.0	2,440	9
Clinton	768	2.0	7.1	992	1
Daviess	2,296	4.3	6.6	907	3
Dekalb	935	2.4	8.4	4,372	2
Gentry	1,366	2.9	7.5	2,070	4
Grundy	1,757	4.4	5.5	93	2
Harrison	2,915	4.3	9.2	5,094	5
Holt	800	1.9	8.9	16,982	12
Linn	2,699	4.8	5.1	6,744	2
Livingston	1,831	3.8	6.8	9,161	3
Mercer	1,961	4.6	7.5	3,053	5
Nodaway	1,547	1.8	8.9	5,406	2
Ray	1,375	2.6	11.5	1,786	3
Worth	981	3.8	8.4	3,399	3
Total (t)/Avg (a)	**t = 29,004**	**a = 3.1**	**a = 9.4**	**t = 88,480**	**t = 88**

Ozark Region Deer Summary

Total deer harvest in the Ozark Region in 2019 was 40,668, which was 2% higher than in 2018 (**Table 1, Figure 9**). The Ozark Region ranked 3rd in total harvest and 4th in harvest per square mile. Top harvest counties in 2019 were Texas, Howell, and Dent. The deer population in the Ozark Region has been increasing steadily (**Figure 9**) as has the deer population in much of southern Missouri. Surveys indicate that deer populations across the Ozark Region are currently at socially acceptable numbers (**Figure 15**).

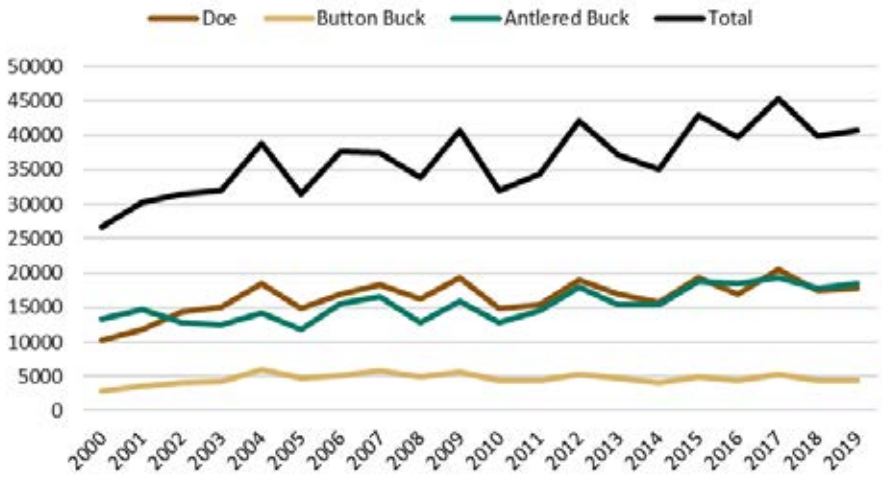


Figure 9. Ozark Region harvest trend from 2000-2019.

County	Total Harvest	Deer Harvested Per Square Mile	Trips per Kill (Firearms)	Public Land Hunting Acres	Number Public Hunting Areas
Carter	1,928	3.9	11.8	156,341	9
Dent	4,073	5.5	8.1	96,125	12
Douglas	3,189	4.0	7.0	43,388	5
Howell	4,800	5.4	6.3	59,283	9
Oregon	3,405	4.4	6.6	106,829	4
Ozark	2,839	4.0	5.6	68,022	7
Phelps	3,098	4.8	7.9	68,228	6
Pulaski	2,733	5.3	13.3	92,159	15
Ripley	3,004	5.0	9.6	111,847	8
Shannon	3,452	3.5	10.0	380,637	12
Texas	5,169	4.5	6.6	70,271	14
Wright	2,978	4.5	4.5	9,722	6
Total (t)/Avg (a)	**t = 40,668**	**a = 4.6**	**a = 8.1**	**t = 1,262,852**	**t = 107**

Southeast Region Deer Summary

The total deer harvest within the Southeast Region in 2019 was 31,545, which was 6% lower than in 2018 (**Table 1, Figure 10**). Among regions, the Southeast Region ranked 5th in total deer harvest and 7th in harvest per square mile. Top harvest counties were Bollinger, Wayne, and Cape Girardeau. The region has some of the most diverse habitat in the state causing the deer population to vary dramatically throughout the region. Like the Ozark Region, the deer population in the Southeast Region has been growing for many years. Survey data indicate that the regional deer population is at socially acceptable levels with only a few counties below desired levels (**Figure 15**).

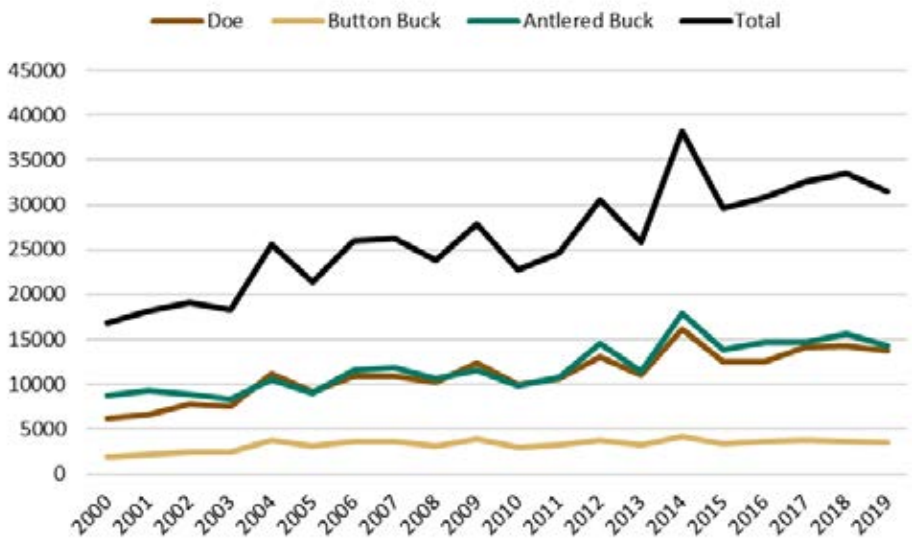


Figure 10. Southeast Region harvest trend from 2000-2019.

County	Total Harvest	Deer Harvested Per Square Mile	Trips per Kill (Firearms)	Public Land Hunting Acres	Number Public Hunting Areas
Bollinger	4,369	7.4	7.6	16,124	13
Butler	1,771	2.8	12.2	62,724	10
Cape Girardeau	3,098	5.8	7.7	4,187	6
Dunklin	489	1.0	2.8	6,754	7
Iron	1,469	2.7	12.7	107,229	7
Madison	2,573	5.4	8.4	55,966	5
Mississippi	287	0.7	5.5	5,182	2
New Madrid	302	0.5	25.4	6,380	3
Pemiscot	138	0.3	9.8	9,231	3
Perry	3,059	6.7	7.9	1,664	3
Reynolds	2,232	2.8	10.3	166,715	8
Saint Francois	2,572	6.4	8.4	1,384	3
Sainte Genevieve	2,437	5.1	11.3	12,764	3
Scott	728	1.8	6.4	1,240	3
Stoddard	2,270	2.9	8.3	17,736	7
Wayne	3,751	5.2	11.4	124,881	15
Total (t)/Avg (a)	**t = 31,545**	**a = 3.6**	**a = 9.8**	**t = 600,161**	**t = 98**

Southwest Region Deer Summary

During the 2019 hunting season, 41,771 deer were harvested in the Southwest Region. This total was 2% higher than the 2018 harvest (**Table 1, Figure 11**). Regional deer harvest ranked 2nd, and the number of deer harvested per square mile ranked 5th. Top harvest counties were Laclede, Dallas, and Webster. The deer population has exhibited a slowly increasing trend over time. Survey data indicate the regional deer population is at socially acceptable levels in most counties (**Figure 15**).

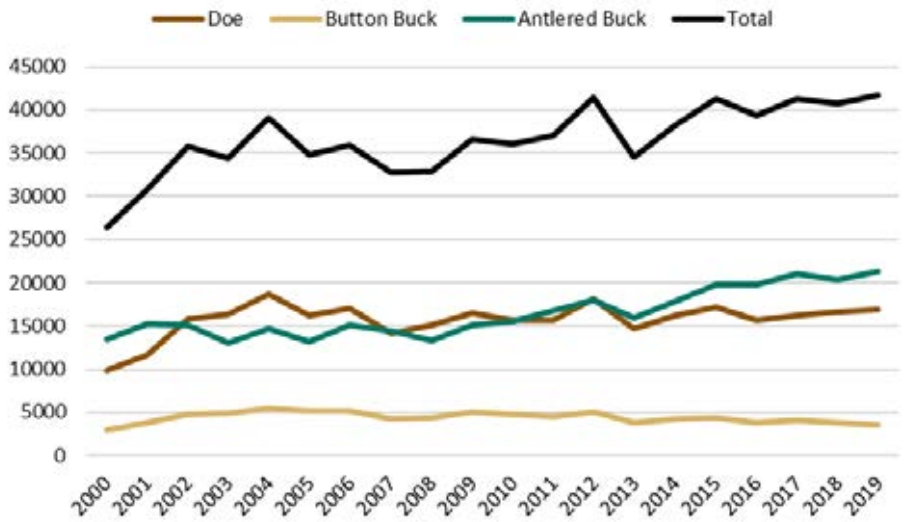


Figure 11. Southwest Region harvest trend from 2000-2019.

County	Total Harvest	Deer Harvested Per Square Mile	Trips per Kill (Firearms)	Public Land Hunting Acres	Number Public Hunting Areas
Barry	2,308	3.1	9.2	58,665	4
Barton	1,748	3.2	5.0	7,335	15
Cedar	2,321	5.1	8.3	4,656	7
Christian	1,994	3.8	6.7	54,982	2
Dade	1,636	3.4	6.5	13,951	7
Dallas	3,377	6.4	9.6	8,956	6
Greene	2,930	5.1	6.1	4,798	6
Hickory	2,509	6.5	6.4	10,444	6
Jasper	2,345	4.2	6.6	0	0
Laclede	3,935	5.3	5.7	32,553	6
Lawrence	1,959	3.3	7.2	4,906	4
McDonald	2,003	3.8	4.9	3,178	7
Newton	2,575	4.4	6.2	6,964	8
Polk	2,891	4.7	6.0	9,342	6
Stone	1,772	4.1	6.1	13,000	6
Taney	2,372	4.1	9.0	95,516	6
Webster	3,036	5.3	4.9	1,723	3
Total (t)/Avg (a)	**t = 41,711**	**a = 4.5**	**a = 6.7**	**t = 330,969**	**t = 99**

St. Louis Region Deer Summary

A total of 29,478 deer were harvested in the St. Louis Region in 2019, which was 9% higher than the 2018 harvest (**Table 1, Figure 12**). The St. Louis Region ranked 6th in total deer harvest and 1st in deer harvest per square mile. Top harvest counties were Franklin, Jefferson, and Crawford. The deer population in the St. Louis Region has been increasing slowly over time. Survey data indicate that the deer population within the St. Louis Region is at socially acceptable levels (**Figure 15**).

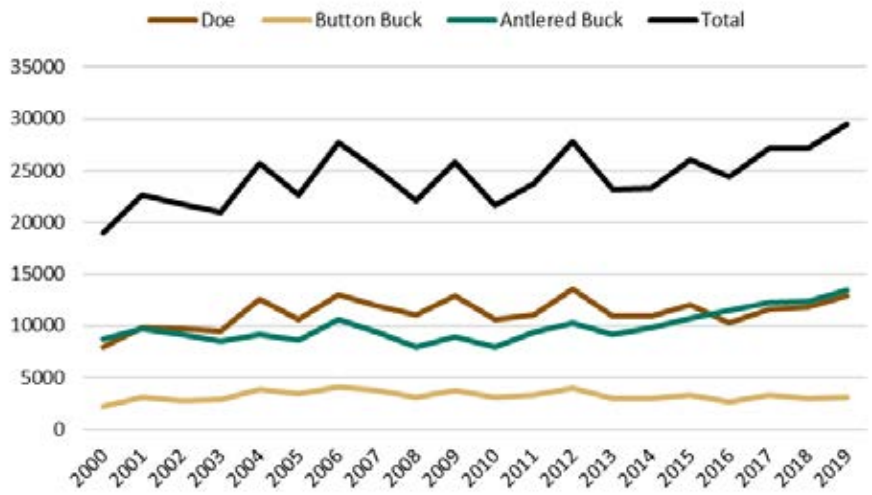


Figure 12. St. Louis Region harvest trend from 2000-2019.

County	Total Harvest	Deer Harvested Per Square Mile	Trips per Kill (Firearms)	Public Land Hunting Acres	Number Public Hunting Areas
Crawford	3,963	5.6	7.5	59,895	8
Franklin	6,255	7.4	6.9	9,259	6
Jefferson	4,964	8.7	8.9	4,128	7
Lincoln	3,787	6.6	8.8	11,287	9
Saint Charles	2,275	5.3	6.7	25,658	7
Saint Louis	2,092	9.5	7.4	14,825	11
Warren	3,118	7.8	9.0	7,904	3
Washington	3,024	4.1	12.7	94,074	6
Total (t)/Avg (a)	**t = 29,478**	**a = 6.9**	**a = 8.5**	**t = 227,030**	**t = 57**

County Deer Population Trends

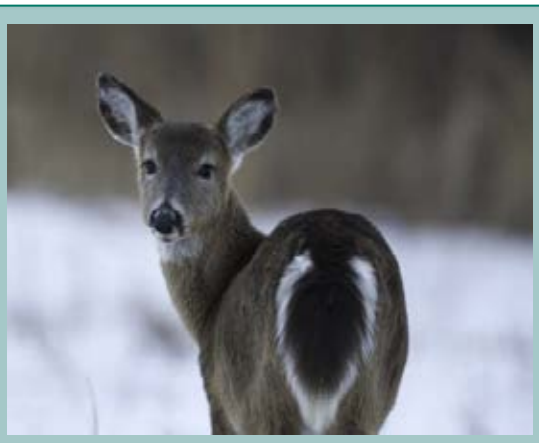
Deer populations can be highly variable within a region and even within a county due to variation in habitat availability, harvest regulations, local hunter goals and density, amount of public and private land, and disease outbreaks (e.g., hemorrhagic disease). Therefore, county-wide assessments of deer population trends are not applicable to every local situation but are a general representation of the status and population trend.

The Deer Program evaluates a variety of data to assess county-specific deer populations and for hunting regulation development including:

- **Harvest data** —The total number and composition (antlered bucks, does, and button bucks) of harvested deer.
- **Population data** — Population simulations incorporating age-at-harvest data and estimated survival and reproduction rates.
- **Hunter, landowner, and staff surveys** — Hunters and landowners are randomly selected to receive mail surveys.
- **Public and staff input** — Input is received via email, the MDC website, public meetings, and phone calls.

Survey data is critical when assessing the deer population in relation to public acceptance levels. In cooperation with the USDA, we send out surveys statewide to about 9,000 agricultural producers to assess perceptions and attitudes toward deer populations and regulations. Additionally, we survey between 50,000-80,000 deer hunters annually to estimate hunter effort, hunter density, and opinions concerning deer populations and regulations. We also consider public comments received throughout the year via the web, letters, calls, social media, public meetings, and emails.

The Deer Program reviews this information annually on a county-by-county basis to classify the deer population status and trends **(Figures 5-12)**. Socially acceptable levels (cultural carrying capacity) are the first thing we look at when classifying the status of the deer population. Although biological carrying capacity, or the habitat's limitations on the number of deer that can be supported, is included within our assessment, cultural carrying capacity will typically be met first. We aim for this goal because when deer populations are at biological carrying capacity, numbers are also high enough to increase deer-human conflict. By monitoring population trends for each county, we can gain an understanding of population status and adjust harvest regulations accordingly.



The goal of MDC's Deer Management Program is to maintain stable deer populations within each county that are at a socially acceptable level for most stakeholders. Currently, deer populations are stable to increasing across most of Missouri and are generally at socially acceptable levels. Exceptions include portions of northwestern Missouri that are still recovering from a severe outbreak of hemorrhagic disease that occurred in 2012 as well as habitat loss due to conversion of grassland to row-crop agriculture. Across most of the state, the deer population has recovered from the population decline that occurred because of the hemorrhagic disease outbreak.

County Deer Statistics

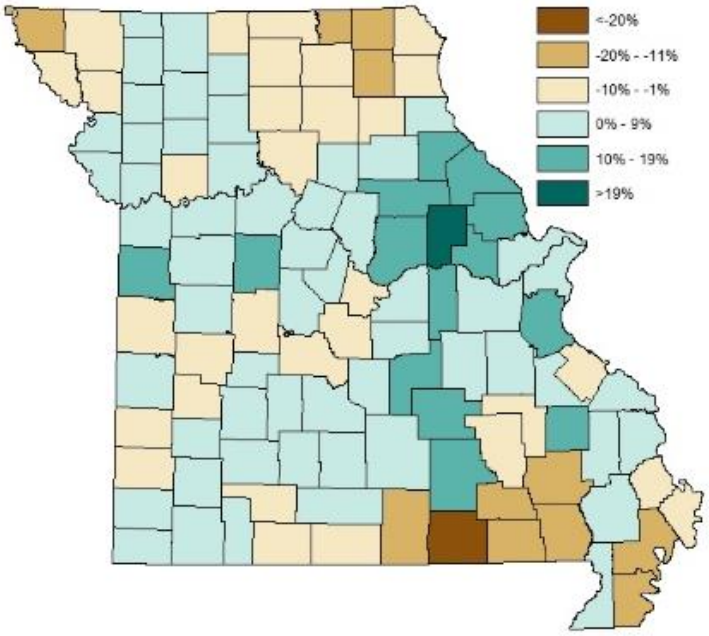


Figure 13. Percent change in the county-level deer harvest in Missouri in 2019 compared to the 5-year average.

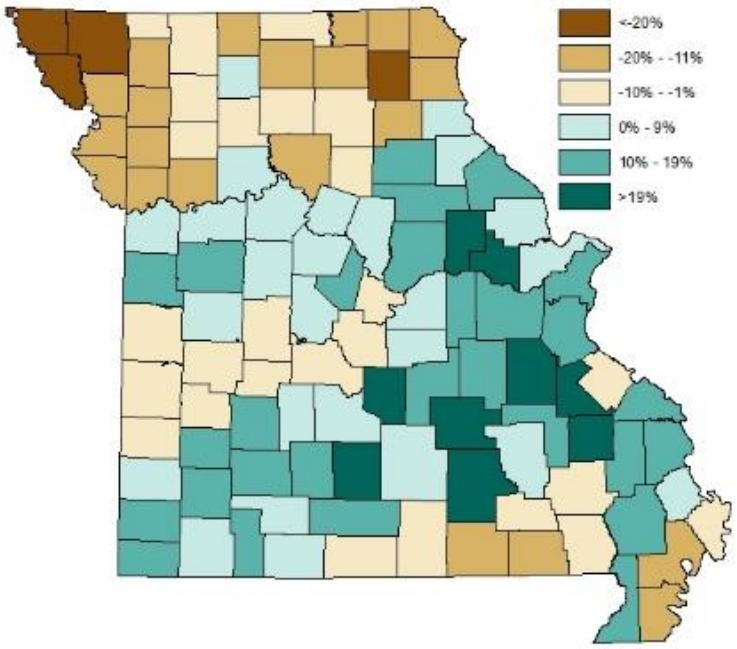


Figure 14. Percent change in the county-level deer harvest in Missouri in 2019 compared to the 10-year average.

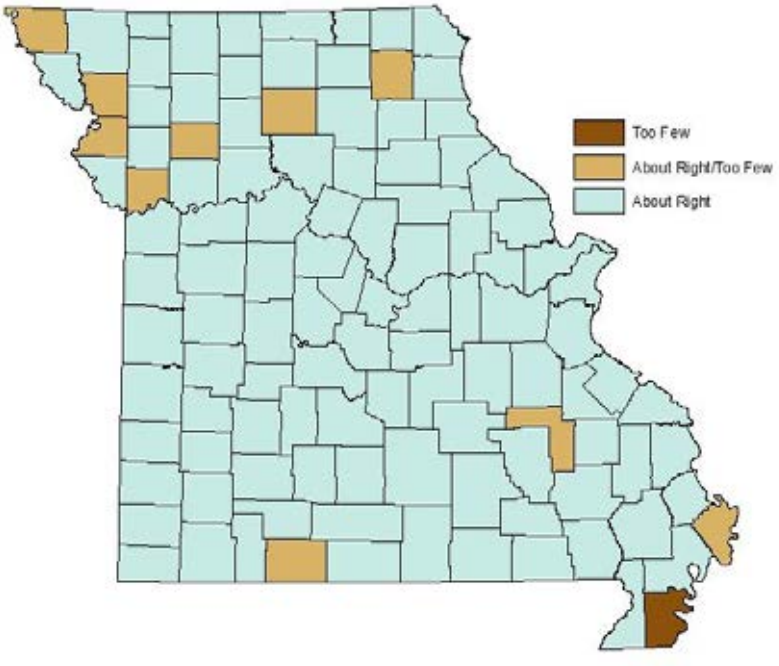


Figure 15. County-specific deer populations, in Missouri, based on socially acceptable levels, 2019. See page 16 for information on how this assessment was made.

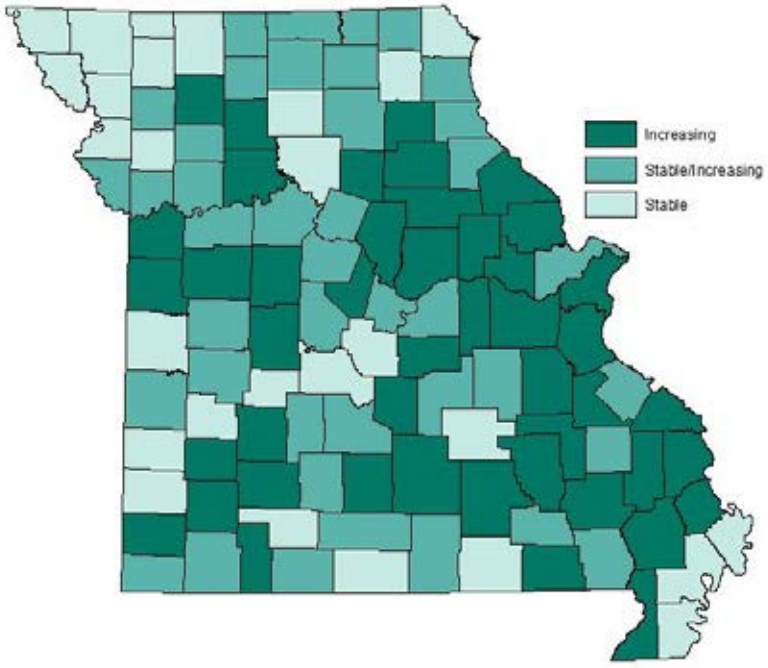


Figure 16. County-specific deer population trends in Missouri, 2019. See page 16 for information on how this assessment was made.

Table 5. County Deer Harvest Totals

	Archery				Firearms				Totals[1]			
County	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total
Adair	281	51	297	629	984	199	762	1,945	1,265	250	1,059	2,574
Andrew	109	9	81	199	462	71	274	807	571	80	355	1,006
Atchison	67	4	51	122	313	24	138	475	380	28	189	597
Audrain	207	51	196	454	807	210	755	1,772	1,014	261	951	2,226
Barry	172	28	214	414	992	172	729	1,893	1,165	200	943	2,308
Barton	154	15	166	335	696	124	588	1,408	854	139	755	1,748
Bates	174	26	174	374	856	127	547	1,530	1,030	153	722	1,905
Benton	343	64	378	785	1,430	384	1,468	3,282	1,777	453	1,854	4,084
Bollinger	280	140	513	933	1,394	427	1,614	3,435	1,674	567	2,128	4,369
Boone	382	70	407	859	1,212	249	1,090	2,551	1,594	319	1,498	3,411
Buchanan	72	7	42	121	325	46	223	594	397	53	265	715
Butler	225	65	297	587	563	123	491	1,177	791	188	792	1,771
Caldwell	132	20	104	256	651	102	433	1,186	783	122	537	1,442
Callaway	433	106	607	1,146	1,772	453	2,230	4,455	2,239	575	2,894	5,708
Camden	361	97	488	946	1,144	308	1,131	2,583	1,505	405	1,619	3,529
Cape Girardeau	207	57	347	611	1,127	228	1,132	2,487	1,334	285	1,479	3,098
Carrol	185	29	173	387	942	141	729	1,812	1,127	170	902	2,199
Carter	216	86	282	584	651	132	464	1,247	903	227	798	1,928
Cass	275	43	240	558	978	109	548	1,635	1,253	152	788	2,193
Cedar	228	28	205	461	990	141	662	1,793	1,231	179	911	2,321
Chariton	183	14	117	314	890	96	510	1,496	1,077	110	627	1,814
Christian	254	32	204	490	778	145	581	1,504	1,032	177	785	1,994
Clark	237	39	198	474	660	210	762	1,632	897	249	960	2,106
Clay	179	30	178	387	325	39	189	553	524	71	389	984
Clinton	82	9	64	155	354	42	210	606	438	53	277	768
Cole	160	40	160	360	450	141	656	1,247	610	182	821	1,613
Cooper	183	33	224	440	853	184	916	1,953	1,036	217	1,140	2,393
Crawford	279	94	297	670	1,549	393	1,351	3,293	1,828	487	1,648	3,963
Dade	136	21	111	268	762	117	488	1,367	898	138	600	1,636
Dallas	299	56	316	671	1,311	242	1,145	2,698	1,610	299	1,468	3,377
Daviess	227	27	256	510	877	144	765	1,786	1,104	171	1,021	2,296
DeKalb	89	13	64	166	445	60	263	768	535	73	327	935
Dent	223	65	279	567	1,612	407	1,487	3,506	1,835	472	1,766	4,073

[1]Includes deer harvested during managed hunts.

Table 5. County Deer Harvest Totals

	Archery				Firearms				Totals[1]			
County	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total
Douglas	197	42	247	486	1,432	231	1,038	2,701	1,630	273	1,286	3,189
Dunklin	58	13	59	130	197	32	130	359	255	45	189	489
Franklin	516	115	669	1,300	2,401	518	2,032	4,951	2,917	634	2,704	6,255
Gasconade	290	56	344	690	1,568	371	1,423	3,362	1,858	427	1,767	4,052
Gentry	133	13	109	255	601	101	409	1,111	734	114	518	1,366
Green	402	68	382	852	1,060	172	793	2,025	1,471	247	1,212	2,930
Grundy	175	22	163	360	701	116	580	1,397	876	138	743	1,757
Harrison	348	24	265	637	1,230	190	858	2,278	1,578	214	1,123	2,915
Henry	259	77	358	694	1,095	228	991	2,314	1,354	305	1,351	3,010
Hickory	184	51	232	467	1,023	190	823	2,036	1,208	241	1,060	2,509
Holt	89	11	65	165	390	34	208	632	480	45	275	800
Howard	231	29	223	483	980	110	801	1,891	1,215	146	1,041	2,402
Howell	351	81	385	817	1,780	439	1,764	3,983	2,131	520	2,149	4,800
Iron	134	42	143	319	625	133	392	1,150	759	175	535	1,469
Jackson	358	58	404	820	415	73	270	758	866	153	852	1,871
Jasper	281	44	257	582	1,048	100	615	1,763	1,329	144	872	2,345
Jefferson	580	184	845	1,609	1,646	355	1,350	3,351	2,229	539	2,196	4,964
Johnson	275	31	207	513	1,077	149	811	2,037	1,367	194	1,110	2,671
Knox	184	40	228	452	680	167	722	1,569	864	207	950	2,021
Laclede	331	63	388	782	1,680	310	1,141	3,131	2,011	381	1,543	3,935
Lafayette	115	21	115	251	532	105	416	1,053	647	126	531	1,304
Lawrence	197	27	191	415	841	146	557	1,544	1,038	173	748	1,959
Lewis	155	26	194	375	608	170	731	1,509	763	198	938	1,899
Lincoln	322	71	406	799	1,373	306	1,309	2,988	1,695	377	1,715	3,787
Linn	307	34	270	611	1,155	117	791	2,063	1,462	156	1,081	2,699
Livingston	178	19	151	348	771	124	588	1,483	949	143	739	1,831
Macon	424	66	415	905	1,569	292	1,177	3,038	1,995	359	1,603	3,957
Madison	182	74	282	538	865	283	887	2,035	1,047	357	1,169	2,573
Maries	175	60	219	454	784	256	914	1,954	959	316	1,133	2,408
Marion	177	43	246	466	679	199	801	1,679	856	242	1,047	2,145
McDonald	174	17	159	350	902	99	652	1,653	1,076	116	811	2,003

[1]Includes deer harvested during managed hunts.

Table 5. County Deer Harvest Totals

	Archery				Firearms				Totals[1]			
County	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total
Mercer	285	26	238	549	804	93	514	1,411	1,089	119	753	1,961
Miller	182	69	284	535	867	341	1,139	2,347	1,049	410	1,423	2,882
Mississippi	38	1	28	67	165	2	53	220	203	3	81	287
Moniteau	104	23	150	277	606	191	745	1,542	710	214	895	1,819
Monroe	292	65	316	673	1,209	326	1,173	2,708	1,509	397	1,526	3,432
Montgomery	239	75	341	655	1,299	321	1,417	3,037	1,538	396	1,758	3,692
Morgan	313	92	424	829	1,285	439	1,631	3,355	1,598	532	2,055	4,185
New Madrid	34	2	34	70	177	11	44	232	211	13	78	302
Newton	313	46	264	623	1,094	157	682	1,933	1,416	204	955	2,575
Nodaway	182	8	132	322	734	67	424	1,225	916	75	556	1,547
Oregon	269	74	292	635	1,067	345	1,358	2,770	1,336	419	1,650	3,405
Osage	255	80	439	774	1,395	462	2,009	3,866	1,651	542	2,448	4,641
Ozark	203	42	223	468	1,132	216	986	2,334	1,350	263	1,226	2,839
Pemiscot	12	2	15	29	68	4	37	109	80	6	52	138
Perry	132	50	249	431	1,154	272	1,202	2,628	1,286	322	1,451	3,059
Pettis	234	33	225	492	963	189	863	2,015	1,197	222	1,088	2,507
Phelps	226	66	288	580	1,134	285	1,099	2,518	1,360	351	1,387	3,098
Pike	369	82	517	968	1,533	306	1,701	3,540	1,907	388	2,228	4,523
Platte	184	25	168	377	388	51	265	704	572	76	433	1,081
Polk	265	53	284	602	1,189	203	897	2,289	1,454	256	1,181	2,891
Pulaski	300	65	366	731	861	234	905	2,000	1,162	299	1,272	2,733
Putnam	395	32	352	779	959	122	648	1,729	1,354	154	1,000	2,508
Ralls	233	46	237	516	857	247	877	1,981	1,090	293	1,114	2,497
Randolph	223	37	230	490	957	186	775	1,918	1,180	223	1,005	2,408
Ray	137	18	103	258	622	75	420	1,117	759	93	523	1,375
Reynolds	226	71	271	568	960	166	538	1,664	1,186	237	809	2,232
Ripley	236	85	273	594	898	296	1,215	2,409	1,134	381	1,489	3,004
St. Charles	211	54	281	546	720	146	624	1,490	1,015	226	1,034	2,275
St. Clair	335	68	331	734	1,370	243	1,055	2,668	1,708	313	1,391	3,412
St. Francois	255	81	271	607	906	251	808	1,965	1,161	332	1,079	2,572
St. Louis	446	110	674	1,230	370	55	276	701	872	187	1,033	2,092

[1]Includes deer harvested during managed hunts.

Table 5. County Deer Harvest Totals

	Archery				Firearms				Totals[1]			
County	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total	Antlered Buck	Button Buck	Doe	Total
Ste. Genevieve	159	42	219	420	1,039	176	802	2,017	1,198	218	1,021	2,437
Saline	203	24	176	403	856	111	633	1,600	1,059	135	809	2,003
Schuyler	144	25	137	306	430	152	564	1,146	574	177	701	1,452
Scotland	214	59	292	565	649	244	896	1,789	863	303	1,188	2,354
Scott	65	14	92	171	310	51	196	557	375	65	288	728
Shannon	243	57	248	548	1,328	305	1,255	2,888	1,579	363	1,510	3,452
Shelby	206	55	247	508	745	224	878	1,847	952	279	1,125	2,356
Stoddard	257	86	390	733	756	136	606	1,498	1,029	222	1,019	2,270
Stone	198	32	205	435	672	112	553	1,337	870	144	758	1,772
Sullivan	318	29	231	578	1,082	122	715	1,919	1,400	151	946	2,497
Taney	219	37	219	475	953	159	764	1,876	1,181	199	992	2,372
Texas	348	86	372	806	2,244	414	1,705	4,363	2,592	500	2,077	5,169
Vernon	253	48	294	595	1,063	174	896	2,133	1,331	222	1,199	2,752
Warren	270	55	283	608	1,218	228	1,063	2,509	1,489	283	1,346	3,118
Washington	273	72	287	632	1,102	321	969	2,392	1,375	393	1,256	3,024
Wayne	358	143	516	1,017	1,299	367	1,031	2,697	1,678	515	1,558	3,751
Webster	249	50	286	585	1,216	244	991	2,451	1,465	294	1,277	3,036
Worth	158	9	104	271	412	41	257	710	570	50	361	981
Wright	252	53	279	584	1,275	248	869	2,392	1,529	301	1,148	2,978
Regional												
Central	3,718	905	4,682	9,305	15,878	4,147	17,490	37,515	19,635	5,077	22,252	46,964
Kansas City	2,984	524	3,072	6,580	10,492	1,871	8,319	20,682	13,626	2,440	11,708	27,774
Northeast	3,852	695	4,137	8,684	13,601	3,166	13,182	29,949	17,469	3,870	17,390	38,729
Northwest	3,138	316	2,552	6,006	12,679	1,684	8,594	22,957	15,825	2,007	11,172	29,004
Ozark	3,064	802	3,534	7,400	15,414	3,552	14,145	33,111	18,541	4,369	17,758	40,668
Southeast	2,622	883	3,726	7,231	11,605	2,662	9,963	24,230	14,267	3,550	13,728	31,545
Southwest	4,056	668	4,083	8,807	17,207	2,833	12,661	32,701	21,309	3,531	16,871	41,711
St. Louis	2,897	755	3,742	7,394	10,379	2,322	8,974	21,675	13,420	3,126	12,932	29,478
Statewide												
Totals	26,331	5,548	29,528	61,407	107,255	22,237	93,328	222,820	134,092	27,970	123,811	285,873

[1]Includes deer harvested during managed hunts.

Archery Deer Season Summary

The 2019 archery deer season marked the fourth year of crossbows being a legal method for all archery hunters in Missouri. The Conservation Department began allowing crossbows during the archery season to increase hunter participation. Over the long-term, MDC hopes that allowing crossbows will recruit more youth and adult hunters into archery hunting, retain aging hunters that may not be able to draw back vertical bows, and reactivate hunters that have previously participated in the archery season. During the 2019 archery deer season, hunters harvested 61,407 deer, which was 16% higher than in 2018 and 21% higher than the previous five-year average. The 2019 archery deer harvest was the highest archery harvest total to date. The percentage of the 2019 archery harvest that was taken by hunters using a crossbow was 47%, which was up from 43% in 2018, 38% in 2017, and 30% in 2016.

Prior to 2019, the overall archery harvest trend has remained relatively stable (slightly increasing) over the past decade (**Figure 17**). The average deer harvest during the first three years after crossbows became a legal method (50,822) was about 2% greater than the average from the three previous years (49,461). However, in 2019, the archery deer harvest increased considerably (+16%). The large increase in archery harvest can be attributed mostly to the calendar shift which resulted in the November portion of firearms deer season starting about a week later than it did in 2018. As such, archery hunters could hunt for an additional six days before the November portion started. These additional six days occurred during the peak of the rut when bucks are particularly vulnerable to harvest. Typically, about 20% of the total archery season harvest occurs during the week prior to the November portion. So, it isn't surprising that there was a large increase in the 2019 archery harvest total.

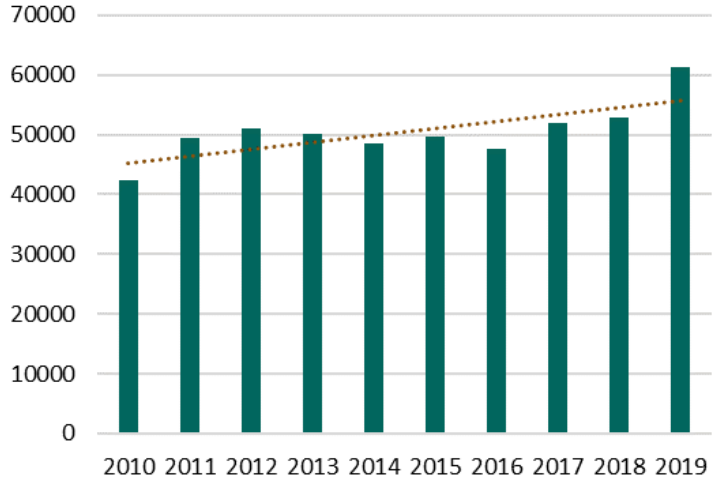


Figure 17. Number of deer harvested during Missouri's archery season, 2010 - 2019.

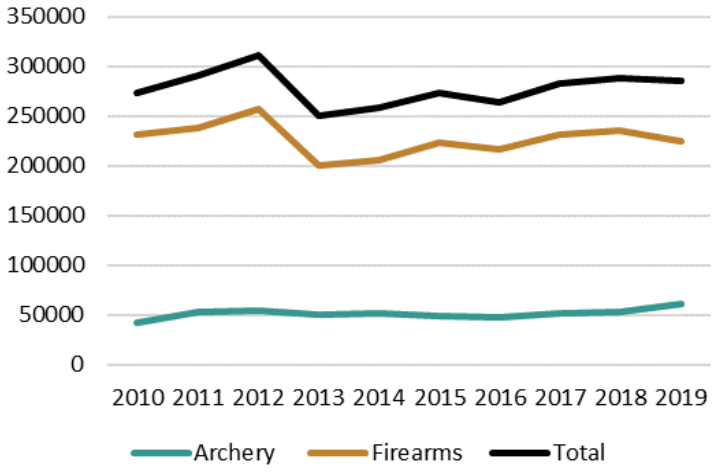


Figure 18. Number of deer harvested during the archery, firearms, and combined archery and firearms hunting seasons in Missouri, 2010 - 2019.

Missouri's overall deer harvest continues to be largely driven by harvest during the firearms portions, which typically account for about 80% of the total harvest (**Figure 18**). Overall, deer harvest in Missouri has exhibited an increasing trend during the last six years as the deer population in many areas of the state has rebounded from the severe hemorrhagic disease outbreak that occurred in 2012.

Of the deer harvested during the 2019 archery season, 26,331 were antlered bucks, 5,548 were button bucks, and 29,528 were does. Allowing crossbows during the archery season has not affected the composition of the archery harvest greatly (**Figure 19**). During the four years prior to allowing crossbows (2012–2015), the average percentage of antlered bucks, button bucks, and does was 38%, 11%, and 50%, respectively. From 2016–2019, these averages were 42%, 10%, and 49%, respectively.

The archery season continues to be a very popular hunting season in Missouri (**Figure 20**). In 2019, 129,775 Archer's Deer Hunting Permits were purchased, which is 5% greater than in 2018, 8% above the previous five-year average, and the highest number since the archery season was initiated. Although, there has been a declining trend in the number of firearms deer permits purchased, more hunters continue to participate in the archery season.

Results of the Conservation Department's last Archery Hunter Survey indicate that the age-distribution of respondents differs considerably based on whether they hunted exclusively with a compound bow or a crossbow (**Figure 21**). On average, a greater percentage of crossbow users were older hunters. The median age of a respondent that used a compound bow exclusively was 44 years old, whereas the average age of a respondent that hunted exclusively with a crossbow was 57 years old. Moreover, respondents ages 61-85 represented just 13% of respondents that hunted exclusively with a compound bow, however, this age group represented 40% of respondents that hunted exclusively with a crossbow. Young hunters (ages 6-10) were also much more likely to hunt with a crossbow than with a compound bow suggesting that crossbows have increased the number of young hunters participating in the archery season (**Figure 21**).

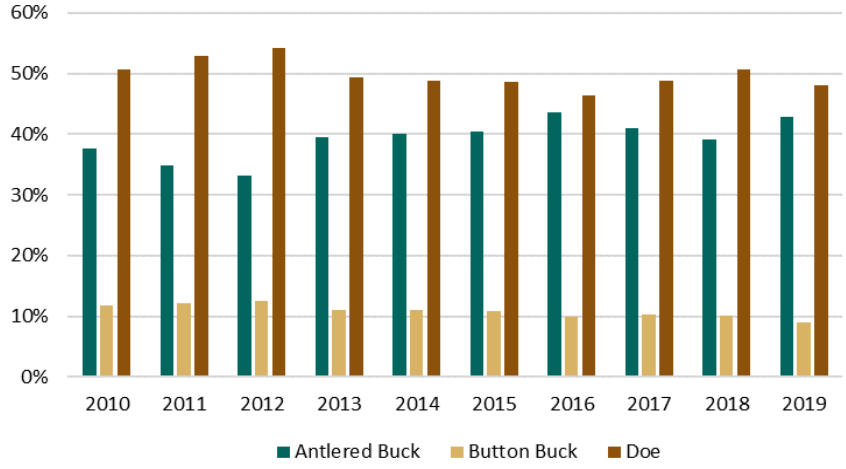


Figure 19. Percentage of antlered bucks, button bucks, and does in the archery season harvest in Missouri, 2010–2019.

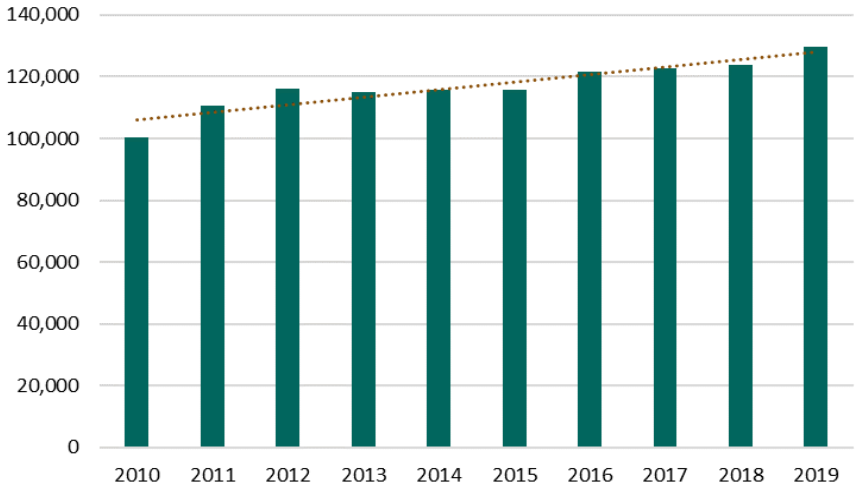


Figure 20. Number of Archery any-deer hunting permits sold in Missouri, 2010–2019. Permit sales do not include no-cost landowner permits or archery antlerless deer hunting permits.

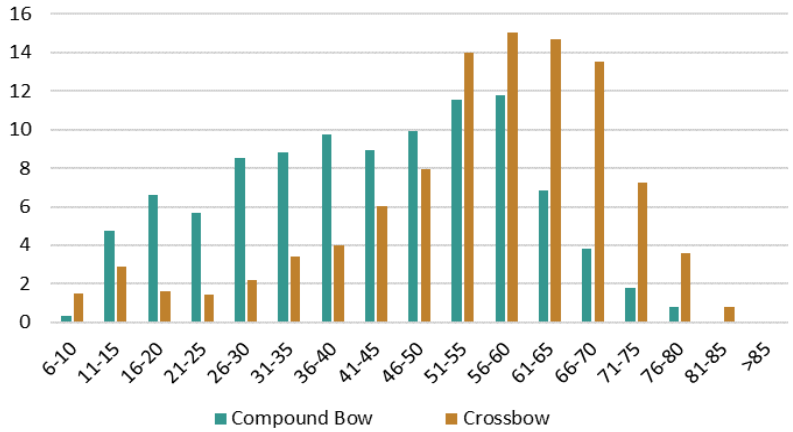


Figure 21. Age distribution of respondents to the Missouri Department of Conservation's 2017 Archery Deer Hunter Survey based on whether respondents hunted exclusively with a compound bow or crossbow.

Deer Management on Private Lands—Evaluating Habitat for White-tailed Deer Management

White-tailed deer have adapted to a variety of habitat types in Missouri and use diverse vegetation and plant successional stages throughout the year. A mixture of forests, woodlands, grasslands, and croplands provides deer with ample food and vegetative cover year-round. Landowners can create and enhance deer habitat and the diversity of vegetation on a property, regardless of its size, by conducting a variety of management practices. Evaluating the current habitat conditions will help a landowner determine the appropriate management practices to implement and is an important step toward successfully managing habitat for white-tailed deer.

Evaluate habitat conditions

Deer habitat is often a byproduct of land use, whether it be forest or agricultural production. However, food and cover for deer can be enhanced through various habitat management practices. A habitat evaluation helps determine the combination of management practices that will help accomplish your objectives. When evaluating the current habitat conditions on a property, you are identifying the components in short supply – the limiting factors. To successfully evaluate habitat, you will need an aerial photo of the property or area, and you will need to observe the existing habitat conditions on the area. You can obtain aerial photos through the following websites:

MU Center for Applied Research and Environmental Systems (https://allthingsmissouri.org/missouri-map-room/)
Google Earth (http://earth.google.com)

Use your observations and the information obtained from the aerial photos to assess the condition of existing habitat. On the worksheet on the next page, identify the habitat types that exist on the property and rank their current condition.

Address the limiting factors

After evaluation, design a habitat management plan that initially focuses on addressing the habitat components or factors that are in shortest supply. Below are two examples of how you can use the evaluation results to identify potential deficiencies on an area.

If the property consists primarily of woodland or forest, consider these questions:

- Does the area have enough openings that provide the early successional vegetation ideal for deer?
- Does the woodland contain a diversity of mast-producing oaks and a variety of trees and shrubs in various stages of succession?
- Does the area contain thick, brushy cover?

If the area consists primarily of pastures and cropland, consider these questions:

- Are adequate amounts of acreage nearby that can provide cover and hard mast?
- Are trees and shrubs needed to address this limiting factor?

Conclusion

Considering these types of questions will help you determine the appropriate combination of management practices that will address the property's liming factors. You don't need a lot of acreage to provide quality habitat. Where landownership patterns consist of many small parcels, deer management can also be effective when neighbors work together toward similar management goals. Managing a large area provides additional opportunities to incorporate beneficial deer habitat management practices on a larger scale and to better manage the deer herd. Developing a habitat management plan is an important step in improving the conditions for white-tailed deer and other wildlife. Before you can develop an effective plan, you need to know the current habitat conditions within the area being managed. Although white-tailed deer have adapted to live and thrive in a variety of habitat types across Missouri, certain conditions make an area more appealing to them. By evaluating the current condition of the habitat, you can identify the property's deficiencies and determine appropriate management practices to implement over time to improve deer habitat on the area.

Habitat can be evaluated in several ways. This guide describes a basic method thatlandowners can use to assess the quality of deer habitat on an area.

Contact a Community and Private Land Conservationist with the Missouri Department of Conservation (http://mdc.mo.gov/contact-us) or MU Extension (http://extension.missouri.edu/locations) for more specific information or assistance in evaluating habitat and developing a white-tailed deer management plan.

Early successional herbaceous vegetation (old fields, pastures, haylands, and prairies)

1. **Native warm-season grasses (percent of field)**
   Excellent – over 50 percent
   Good – 30 to 50 percent
   Poor – Less than 30 percent
2. **Forbs and legumes (number of species available)**
   Excellent – 10 or more species
   Good – 5 to 9 species
   Poor – less than 5 species
3. **Small grains and/or legume canopy coverage (percent of field)**
   Excellent – Over 50 percent
   Good – 25 to 50 percent
   Poor – Less than 25 percent
4. **Eastern red cedar in the field**
   Excellent – None
   Good – Present but being removed from the area
   Poor – Predominant and not under control
5. **Cool-season perennial grasses in the field**
   Excellent – None
   Good – Present but being removed from the area
   Poor – Predominant and not under control
6. **Prescribed fire frequency**
   Excellent – Every 2 to 5 years
   Good – Every 6 to 10 years
   Poor – Most recent was more than 10 years ago
7. **Grazing intensity or haying pressure**
   Excellent – Light or no grazing; haying discontinued by mid-September
   Good – Moderate grazing, leaving cool-season grasses 4 to 6 inches over winter height and warm-season grasses 8-10 inches over winter height
   Poor – Heavy grazing throughout the year
8. **Distance to escape or screening cover**
   Excellent – Entire area of the field is within 50 yards of cover
   Good – Entire area of the field is within 100 years of cover
   Poor – Most of the field is more than 100 yards from cover
9. **Distance to a crop field or food plot of at least 1 acre**
   Excellent – less than ½ mile
   Good – ½ to 1 mile
   Poor – More than 1 mile

Woodlands and forests

1. **Composition of the stand or tract**
   Excellent – Oaks are dominant with an equal amount of both red and white oak groups
   Good – Oaks are dominant but over 75 percent are within either the red or white oak group
   Poor – Other species, such as maples or elms, are dominant; if oaks are present, they constitute less than 10 percent of stand

Woodlands and forests (continued)

2. **Woodland class size and canopy coverage**
   Excellent – Sawtimber with an open canopy, 50 percent canopy coverage
   Good – Sawtimber or pole-sized trees with a closed canopy, 50 to 90 percent canopy coverage
   Poor – Pole-sized trees and a completely closed canopy
3. **Plant Diversity in the understory**
   Excellent – 10 or more species of legumes and forbs, and several shrub species
   Good – 5 to 9 species of legumes and forbs, and a few shrub speices
   Poor – Less than 5 species of legumes and forbs, and no shrubs
4. **Eastern red cedar in the stand or tract**
   Excellent – Scattered or comprises less than 1 contingent acre
   Good – Comprises 2 to 3 contiguous acres
   Poor – Dominates the stand or comprises over 4 contiguous acres
5. **Livestock use of the stand or tract**
   Excellent – None; fencing excludes livestock from grazing the area
   Good – Limited; livestock can graze in woodlands for only a short time in the summer and early fall; fencing excludes livestock during spring, late fall, and winter
   Poor – Unlimited; livestock have year-round access to the stand
6. **Forest openings, temporary or permanent (percent of stand or tract)**
   Excellent – 15 to 30 percent
   Good – 5 to 15 percent or 30 to 50 percent
   Poor – Less than 5 percent or more than 50 percent
7. **Distance to a crop field or food plot of at least 1 acre**
   Excellent – Less than ½ mile
   Good – ½ to 1 mile
   Poor – More than 1 mile

Cropland (corn, grain sorghum or milo, soybeans, wheat, and oats)

1. **Cropping practices**
   Excellent – Leave 4 acres per 40 acres unharvested or as food plot
   Good – Leave 1 to 4 acres per 40 acres unharvested or as food plot
   Poor – completely harvest field
2. **Crop field management**
   Excellent – No fall tillage; crop residues undisturbed or field seeded to a small grain such as winter wheat
   Good – Crop residues left on field but not seeded to a small grain, such as winter wheat, or a cover crop
   Poor – Fall tillage; crop residue removed by tillage, chopping, baling, or grazing
3. **Distance to an ungrazed woodland, forest, or prairie**
   Excellent – Less than ½ mile
   Good – ½ to 1 mile
   Poor – More than 1 mile

Deer Research Projects

Southeast Deer Cropland Study

A 3-year study began during 2016 in southeast Missouri to better understand deer movement ecology related to small soybean fields. To help us understand deer movement, MDC captured and fitted deer with GPS collars during the summer months from 2016-2018. A total of 76 adult does were collared. The GPS collars will help us understand how deer utilize the landscape and help to inform landowners and hunters about deer movements and target efforts to reduce deer densities, especially where deer are causing crop damage. The remainder of the collars were remotely removed from deer in May 2020 concluding the tracking portion of the study. Analysis will occur over the course of the next year. Final results will be made available to the public. Preliminary data showed that deer stayed relatively close to their capture locations throughout the year. This indicates that deer causing damage during the growing season are typically available for harvest nearby in the fall.

Crop damage assessments, crop damage manipulation, and crop planting timing are being investigated in addition to the collaring efforts. We know timing of the plant damage can impact yields in different ways, even leading to increases in yield in some cases. There may also be a correlation in the amount of damage and its impact on yield based on when the crop was planted during the growing season. Our goal is to provide that information to farmers as another way to understand and possibly minimize the impacts of deer damage on crop yield. Data collection efforts related to crop damage assessments and crop planting timing have concluded. We are currently underway with the final year of the crop damage manipulation portion of the study. Analyses will begin in early 2021 with final results and any management recommendations made available to the public and area landowners.

For more information, contact the Deer and Elk Biologist at (573) 815-7901 ext. 2892.

Survival, Recruitment, and Movement of White-tailed Deer in Missouri

This is a 5-year study designed to estimate deer reproduction, movement, and survival in 2 contrasting Missouri landscapes: the glaciated plains of northwest Missouri and the forested hills of the central Ozarks. Movement data from the first 3 years of the study were examined looking at home range size of adult male and female deer by season and study area.

The patterns we observed are that deer range over larger areas in the glaciated plains compared to the Ozarks. Habitat is more fragmented in the north, causing deer to move greater distances to meet their needs of food, water, and cover. We also see that, regardless of region or time of year, adult males cover at least 2-3 times the area of adult females. **For questions about this study, contact the Private Lands Deer Biologist at (573) 815-7901 ext. 2899.**

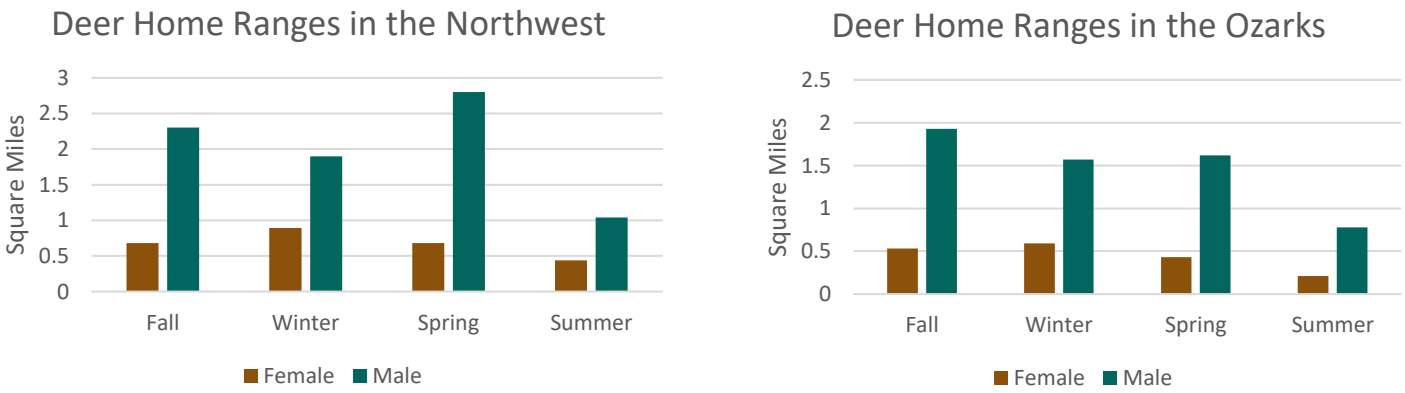


Figure 22. Home range sizes of adult male and adult female white-tailed deer in northwest Missouri and the central Ozarks, 2015-2017.

Age-at-Harvest Sampling

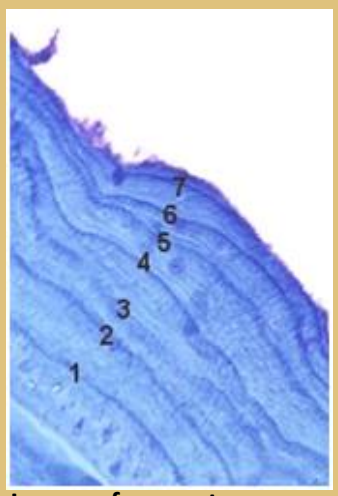
In addition to the information collected through Telecheck, the MDC Deer Program works with universities and meat processors across the state to collect teeth from harvested deer. Extracted teeth are sent to a lab to age the harvested animals. Much like growth rings on a tree, deer deposit a ring of material called "cementum" on the roots of their teeth each year. These rings can be counted to accurately determine the age of adult deer.

The data collected through Age-at-Harvest (A@H) is used by the Deer Program to help monitor changes in harvest trends as well as a comparison to Telecheck. While these data are not substitutes for Telecheck data and, especially in the case of buck harvest, are often not representative of the true age breakdown of the buck population in a county, they do provide valuable insights into the population and hunter preferences. Perhaps the most important use of data collected from A@H is as it relates to the new population modeling system MDC is moving toward for deer. Statistical Population Reconstruction (SPR) uses A@H data along with other key factors like sex- and age-specific survival and reproduction values to help "reconstruct" the deer population across the state. The tooth samples collected through A@H provide valuable insight into the exact ages of the deer within the population, which helps the model more accurately determine the age structure of the population. This information then feeds back into the model as the age of an animal affects its survival and reproduction values.

Incisor tooth of a deer

Table 6. Oldest aged male and female deer, as determined from cementum annuli samples, in Missouri, 2019.

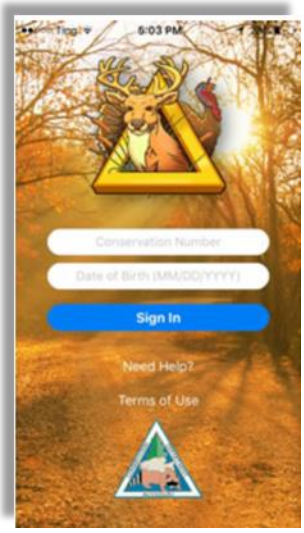
Region	Oldest Aged Male Deer	Oldest Aged Female Deer
Central	6	11
Kansas City	7	17
Northeast	9	15
Northwest	6	17
Ozark	11	14
Southeast	5	13
Southwest	6	7
St. Louis	4	13



Layers of cementum deposited on the root of a deer tooth

Telecheck

Missouri's big-game harvest reporting system, Telecheck, is a powerful monitoring and management tool used by Deer Program staff. Telecheck provides an annual record of harvested deer which helps biologists understand deer population trends and hunter success through time. Telecheck also provides information on the composition—number of male and female fawns, yearlings, and adults—of the annual harvest. Harvest composition is important for understanding the impact of hunters on county deer populations, which helps inform management decisions such as bag limits and season lengths.



Elk in Missouri

Elk, a native species in Missouri, disappeared from the state during the mid-1800s primarily due to unregulated hunting. Elk were reintroduced into Missouri in parts of Carter, Reynolds, and Shannon Counties between 2011 and 2013. This area was chosen for elk restoration due to the high amount of public land, low road density, and low row-crop acreage. The target population is around 400-500 individuals and the herd will be managed through regulated hunting as the population grows.

Researchers with MDC, the University of Missouri, and the University of Montana have been busy monitoring the elk. Crews captured additional elk in Missouri from 2015-2018 to assess their health and to equip them with collars. Capture of these individuals is part of regular monitoring efforts to help better understand how elk are using the landscape, to determine pregnancy status among cow elk, and to monitor survival. The ongoing research project wrapped up in late 2019, and researchers are busy analyzing the data collected throughout the project. So far, the information collected from these collars has helped researchers develop a model to track population growth and make sound management decisions. The population is currently estimated to be around 207 individuals not including calves born in 2020.

Because of the increasing number of elk, an annual growth rate exceeding 10%, and a high bull: cow ratio, the Department approved an initial framework for elk hunting in Missouri in the summer of 2019. In April 2020, the Conservation Commission approved a quota of 5 antlered elk permits for the first ever elk hunt in Missouri, in October and December of 2020.

Permits were distributed by a random lottery, and hunting is permitted in Carter, Reynolds, and Shannon Counties. Missouri residents at least 11 years old and hunter-education certified (or exempt) were eligible to apply for $10. A total of 19,235 people applied (19,182 general, 33 landowner) from May 1-31, 2020. Four permits were awarded to general applicants and 1 permit was awarded to a qualifying landowner. Each permit cost $50. The permits were valid during 2 hunting portions: a 9-day archery season in mid-October and a 9-day firearms season in mid-December. As the population continues to grow, MDC will continually reevaluate hunting regulations and permit quota recommendations to maintain a healthy elk population. New hunting opportunities, including for antlerless elk, could be proposed within the next few years if the population continues its current growth rate.

For more information, visit mdc.mo.gov or contact the Deer and Elk Biologist at (573) 815-7901 ext. 2892.

MO Elk Population Estimate June 2020	
Adult Cows	93
Adult Bulls	42
2 Yr. Old Cows	14
2Yr. Old Bulls	7
1 Yr. Old Cows	26
1 Yr. Old Bulls	25
Total	207*
* Does not include calves born in 2020	

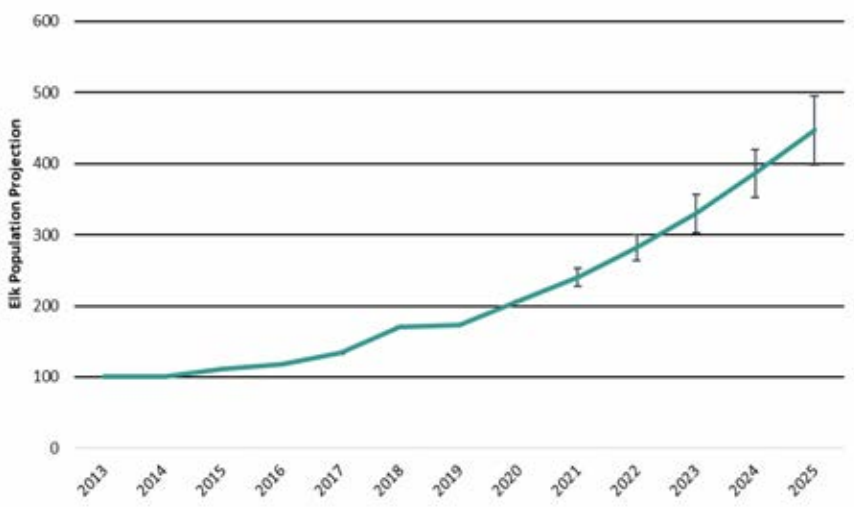


Figure 23. Elk Population Projection 2013-2025

Chronic Wasting Disease

Chronic wasting disease (CWD) is a contagious, always fatal disease of deer, elk, and other members of the deer family. It spreads by direct animal to animal contact, through contact with saliva, feces, and carcass parts of infected animals. There is no known cure, treatment, or vaccine for CWD. Over time, CWD can spread widely and infect a large percentage of a population. When CWD becomes widely established, survival rates decrease, and population impacts can occur. The best way to manage CWD is to prevent its introduction into new areas and limit its spread where it exists.

What Does CWD Look Like?

CWD is a slowly progressing disease. From the time of exposure, it takes an average of 18 months for a deer to appear sick. Once signs of CWD develop, a deer's condition declines rapidly. Animals exhibiting clinical signs of CWD are rarely seen, except in areas where the number of infected deer is very high. Animals in the late stages of CWD are often emaciated, show erratic behavior, and exhibit neurological irregularities. However, due to the long, slow advancement of the disease, infected animals are often killed by predators, vehicles, hunters, or other diseases before signs of CWD get bad enough to be recognizable.

CWD suspect deer
Photo courtesy of Michael Way

CWD in Missouri

Routine, statewide CWD surveillance began in Missouri in 2002. The disease was first detected in captive deer in Linn County in 2010, in captive deer in Macon County in 2011, and in free-ranging deer in Macon County in 2012. Considering the ten-year surveillance history prior to detection of CWD in free-ranging deer and the limited number of cases found in 2012, CWD is a relatively new disease in Missouri. As of June 2020, CWD has been detected in a total of 162 free-ranging deer in 16 counties. While the introduction of CWD into new areas of Missouri is concerning, the percent of CWD-positive deer in these areas remains low, and CWD remains relatively rare in the state.

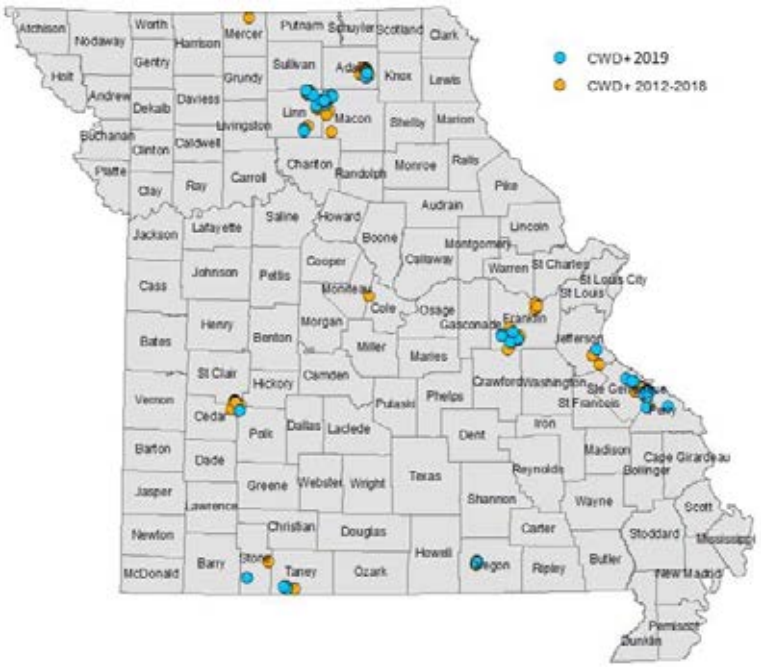


Figure 24. CWD-positive free-ranging detections through June 2020.

County	Year of 1st Detection	Total CWD+ To Date
Adair	2014	19
Cedar	2017	1
Cole	2014	1
Crawford	2018	1
Franklin	2015	19
Jefferson	2016	4
Linn	2015	19
Macon	2012	42
Mercer	2018	1
Oregon	2018	7
Perry	2017	3
Polk	2017	7
St. Clair	2016	8
Ste. Genevieve	2017	23
Stone	2018	3
Taney	2018	4
TOTAL		**162**

What is MDC Doing about CWD?

MDC is monitoring CWD where it is found, detecting the disease early in new locations, and working with hunters, taxidermists, meat processors, landowners, and others to slow or limit the further spread of CWD in Missouri. CWD-related regulations and management actions aim to keep the number of infected deer low over time and limit the potential impacts of the disease far into the future.

Surveillance and Monitoring

MDC works closely with hunters, taxidermists, meat processors, and others to sample and test deer for CWD. Most samples are taken from hunter-harvested deer. Sampling is conducted statewide, but a greater number of samples are collected in areas where CWD has been detected. Greater sampling intensity is needed in these areas to monitor the disease and find new areas of spread as soon as possible. Highlights of the 2019-2020 sampling efforts include:

- Partnerships with over 150 taxidermists and meat processors throughout the state who collected over 8,700 samples
- Nearly 19,000 samples collected by MDC staff in 29 CWD Management Zone Counties on November 16 - 17 during mandatory CWD sampling
- Testing of 361 sick or roadkill deer reported by landowners, hunters, and the public

Disease Management Regulations

Beginning in 2012, regulation changes were implemented within the CWD Management Zone. From 2012-2018, the CWD Management Zone included all counties within 25-miles of CWD detections. The intent was to include areas that were high risk for CWD spread. Regulation changes included:

- A prohibition on the use of feed and minerals intended for deer. Use of these products can spread disease by concentrating animals and increasing contact between them.
- Removal of the antler-point restriction. This restriction protects most yearling males, the deer that disperse the greatest distances and therefore are most likely to move CWD into new areas.
- Moderate increases in antlerless permit availability. These changes are designed to maintain stable populations in the CWD Management Zone and avoid population increases.

In July 2019, the number of counties included in the CWD Management Zone was decreased to exclude counties greater than 10 miles from CWD detections. The change was made after analysis of 4 years of data from a cooperative deer study conducted in Missouri. This study found that over 90% of deer in Missouri disperse less than 10 miles (see page 26 for more information). At that time, Cole, Moniteau, and surrounding counties were removed from the CWD Management Zone because no additional cases of CWD have been found in central Missouri since a single detection in Cole County in March of 2015. During the 2019 deer season, no additional positives were found in new counties in Missouri. However, a CWD detection in southeast Iowa resulted in the addition of Clark County being added to the CWD Management Zone in 2020.

Figure 25: 2019 CWD Management Zone Counties

Figure 26: 2020 CWD Management Zone Counties

Post-Season Targeted Culling

In localized areas where CWD is detected (within 1-2 square-miles), MDC works with landowners on a voluntary basis to remove additional deer after the hunting season closes. The goal is to remove a greater number of potentially infected deer from the population than what is removed during the hunting season. Evidence shows that decreasing the number of infected deer can slow CWD growth rates (i.e., how fast the proportion of infected deer in a population is increasing) and can limit the amount of CWD contamination in the surrounding environment. Decreasing deer densities in these areas may also decrease the number of contacts infected deer make with other deer.

Between January 16 and March 15, 2020, MDC staff and landowners collectively removed nearly 2,400 deer from 15 different areas (see map). Twenty-one of these deer tested positive for CWD. Meat from deer in which CWD was not detected was returned to landowners or donated through the Share the Harvest program.

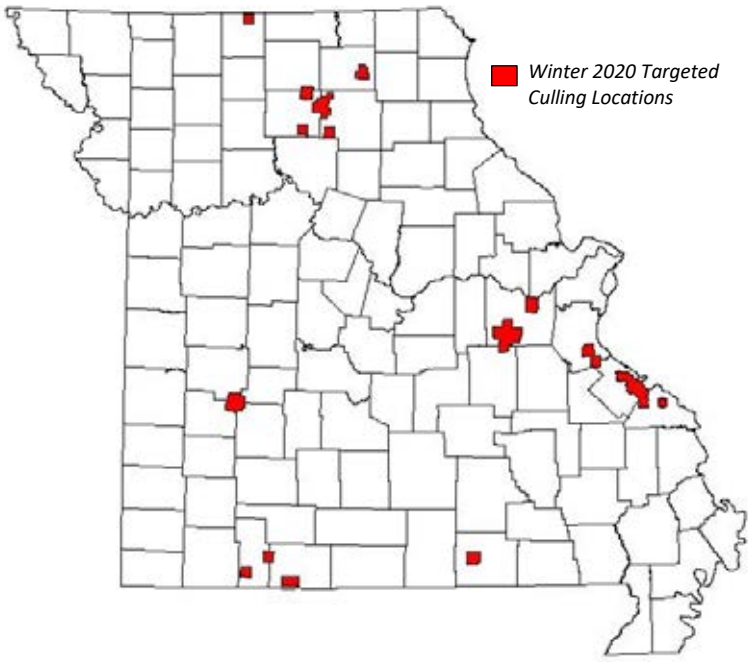


Figure 27. Locations of Targeting Culling operations during the winter of 2020

What Can You Do to Stop CWD?

Hunters, landowners, and wildlife watchers play a vital role in curbing the spread of CWD. You can help in the following ways:

- Properly handle deer carcasses, especially when hunting in areas known to have CWD
  - Wear rubber or latex gloves as a routine precaution when field dressing deer
  - Minimize handling of the brain and spinal cord tissues
  - Wash hands and instruments after handling and field dressing deer
  - Disinfect instruments by soaking in a 50/50 mixture of household bleach and water for a minimum of 5 minutes
  - Consider freezing meat until CWD results are available
- Properly dispose of carcasses, tissues, and other deer parts
  - Place in a permitted landfill or your regular trash collection service
    - If this is not possible, bury the carcass parts on site
  - Do not burn, place in water, or transport to another property
- Follow the new CWD Carcass Transport Regulations (see page 32 for details)
- Have deer tested for CWD, especially deer harvested from the CWD Management Zone
- Report sick deer to your local Conservation Agent or MDC office
- Do not feed deer or place minerals intended for deer (*note: this is prohibited in CWD Management Zone Counties*)
- If you feed birds, do so in a way that excludes deer

CWD and Human Health

There have been no known cases of CWD infection in humans, but some studies suggest CWD could be a risk. The Centers for Disease Control and Prevention (CDC) recommends that hunters have their deer tested before consuming it if hunting in an area where CWD has been found. The CDC also recommends not consuming meat from known CWD-positive animals. For more information, visit https://www.cdc.gov/prions/cwd/index.html.

CWD Carcass Transport Regulations

The following regulation changes became effective in 2020 to help slow the spread of CWD into the state of Missouri and to minimize spread between counties within Missouri.

Cervid Carcass Transport into Missouri from Another State

- Hunters can no longer transport whole deer, elk, or other cervid carcasses into the state of Missouri
- Heads with the cape attached and no more than 6 inches of neck are allowed into the state if they are delivered to a taxidermist within 48 hours of entering Missouri
- The following cervid parts can be transported into Missouri without restriction:
    - Cut and wrapped meat
    - Quartered or boned out meat with no part of the spinal column or head attached
    - Cleaned hide without the head attached
    - Skull, skull plate, or antlers that have been cleaned of all meat and brain tissue
    - Upper canine teeth
    - Finished taxidermy mounts

Deer Harvested in Missouri from a CWD Management Zone County

- Deer must be Telechecked before any parts of the carcass are transported out of the county of harvest
- Whole carcasses and heads may only be transported out of the county of harvest if delivered to a meat processor or taxidermist within 48 hours of exiting the county of harvest
- The following parts may be moved outside of the county of harvest without restriction:
    - Cut and wrapped meat
    - Quartered or boned out meat with no part of the spinal column or head attached
    - Cleaned hide without the head attached
    - Skull, skull plate, or antlers that have been cleaned of all meat and brain tissue
    - Upper canine teeth
    - Finished taxidermy mounts

For more information regarding CWD, visit https://huntfish.mdc.mo.gov/hunting-trapping/wildlife-diseases/chronic-wasting-disease-cwd **or contact the Wildlife Disease Coordinator at 573-815-7901 ext. 2934.**

Chronic Wasting Disease (CWD) Research Projects

CWD Testing Technology Advancement

In early 2020, MDC launched a cooperative research project with the University of Missouri's Engineering and Veterinary Sciences Department to develop and validate testing methodology to detect significantly lower concentrations of prions (the agent that causes CWD) than current standard testing allows. Presently, testing methodology relies on the collection of retropharyngeal lymph nodes (RPLN) or the obex region of the brainstem, tissues that can only be collected post-mortem and can be difficult or inconvenient to collect. The University of Missouri has developed a microelectromechanical system (MEMS)-based biosensor for the detection of low levels of bacterial pathogens and toxins based on antigen-antibody reactions. Researchers aim to adapt this technology to detect CWD prions, opening the possibility of future CWD-detection in novel tissues and the development of portable, field-based tests for CWD. To validate this technology, the project will also standup a known amplification assay, Real-Time Quake-Induced Conversion (RT-QuIC).

The primary goal of the first season of this project was to collect as many heads and blood samples from CWD-positive deer as possible during targeted culling efforts. Targeted culling is a key management action that is implemented each winter after the close of regular deer seasons in areas where CWD is found. MDC field staff collected a total of 482 heads and 416 blood samples. Of those totals, nine heads and seven blood samples were collected from CWD-positive deer that will be used for this study.

CWD Prion Strain Typing

In 2019, MDC entered into a two-year agreement with Colorado State University (CSU) Prion Research Center's Zabel Laboratory to support and participate in their ongoing project examining CWD prion strains. Research into other prion diseases, and early research on CWD strains, suggests that different CWD strains exist. Comparing CWD prion strains may be able to inform theories about the origin and spread of CWD. Further, differences in prion strain-type can influence host specificity, transmission and clinical characteristics, and understanding these differences may inform a greater understanding of transmission dynamics, efficacy of management actions, and even potentially help assess the probability of cross-species infection.

Characterizing prions is a long, complicated, and expensive process, and work in this field has been minimal to date. This project is one of the first to attempt to compare prion strains over a large geographic area. Missouri is just one of many states that have contributed to the project, submitting samples from CWD-positive deer collected during the 2017-2018 deer season. Over the course of the 2-year project, collaborators at CSU will work to characterize differences, if any, in CWD strain types in Missouri and in the longer term compare Missouri's CWD strains with CWD strains identified across North America.

For more information on CWD Research, contact the Wildlife Health Program Supervisor at (573) 815-7901 ext. 2934

Missouri Department of Conservation